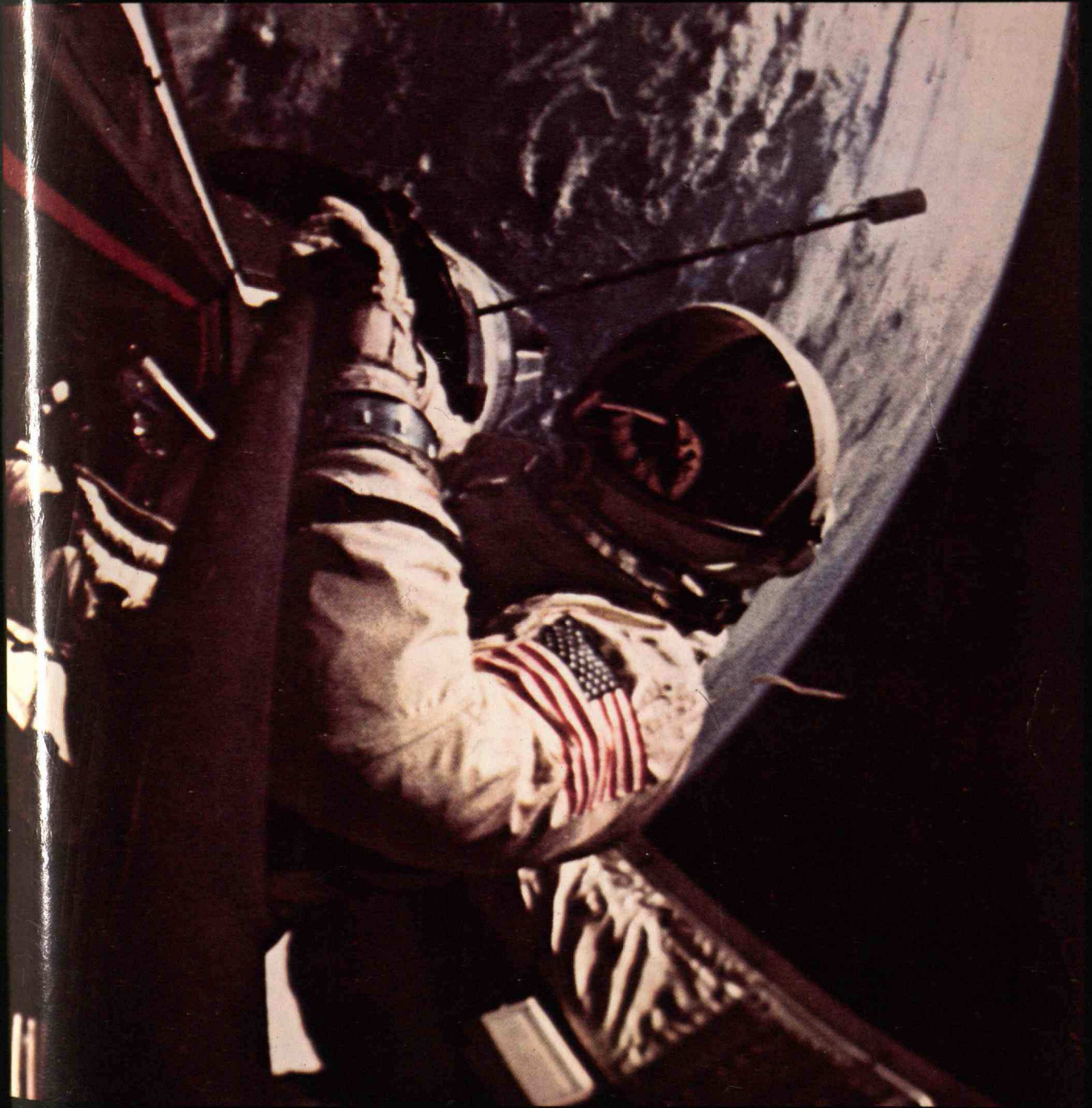


Technology Review

Edited at the Massachusetts Institute of Technology

February, 1967



"Buzz" Aldrin Speaks
on Gemini 12

technology review

Published by MIT

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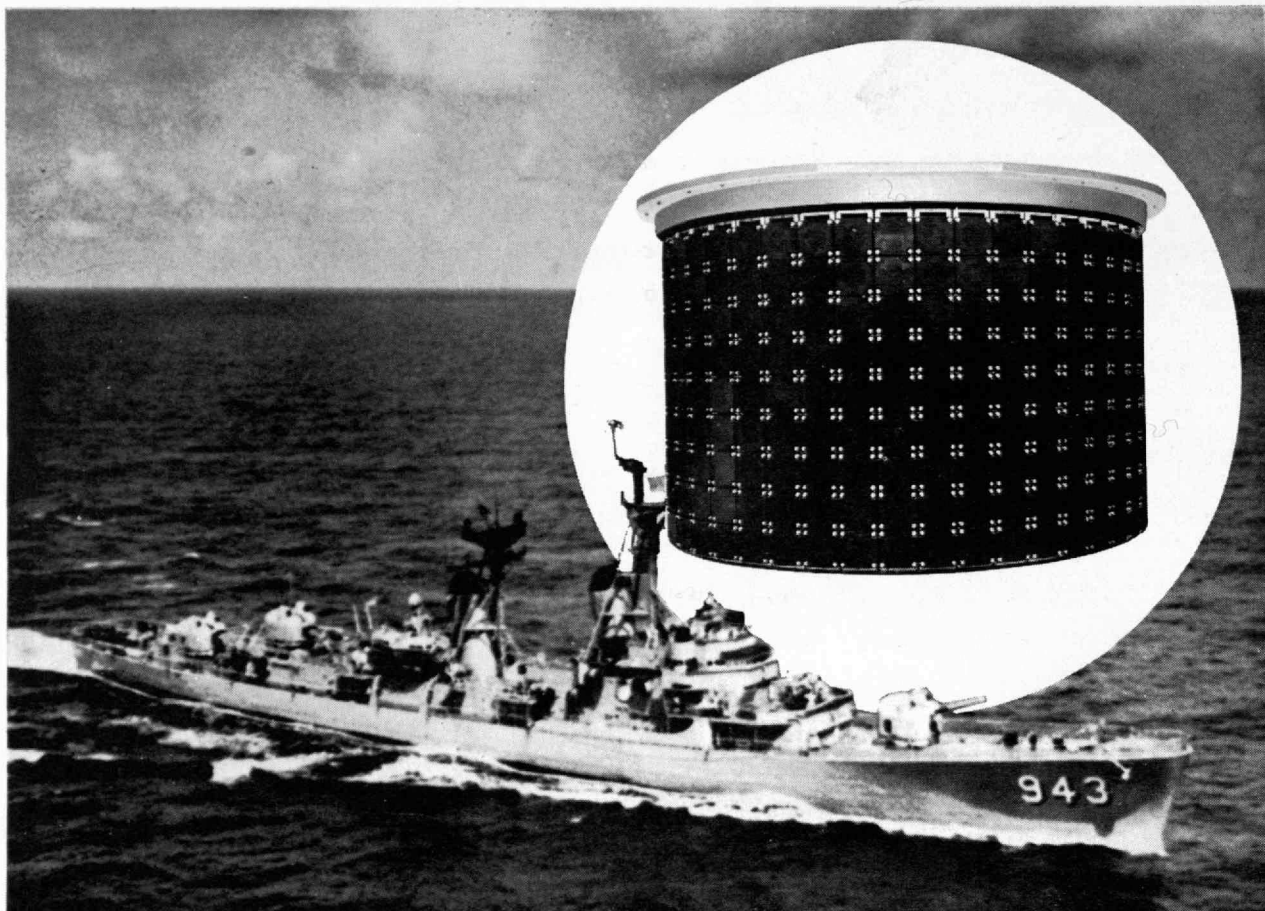
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Published monthly from November to July, inclusive, at the Massachusetts Institute of Technology.

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Inquiries regarding editorial contents, subscriptions, and advertising should be addressed to:

Technology Review
Room E19-430
Massachusetts Institute of Technology
Cambridge, Mass., 02139

Telephone area code 617, 864-6900, extension 4871.

The Review is printed by the Rumford Press, Concord, N.H.
Second class postage paid at Concord, N.H.

Price, 60 cents per copy, \$4 per year in the United States, \$4.50 in Canada and other foreign countries. Please allow three weeks for changes of address, and give both old and new addresses in all requests.

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Next month: Irwin W. Sizer, Head of M.I.T.'s Department of Biology, writes on the role of molecular biology in the future of man. Can the basic insights that molecular biologists are now gaining into the nature of life itself suggest solutions to the problems of overpopulation and pollution? And what ethical questions arise from the new discoveries of molecular biology?



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Pollution and Weather

By Robert C. Cowen, '49

Every time you start up a car you join in the biggest weather experiment going. You add your mite to the massive air pollution that is the hallmark of industrial society. The bad effects of this on people are widely recognized. But the effect on weather is not at all obvious.

Finding out about it is high on the list of research priorities for meteorologists as they move into an era in which they expect greatly to improve forecasting and to investigate the possibilities of weather and climate control.

It may turn out that man can't do very much to change weather to his liking. But he may well be changing it inadvertently and in ways that, in the long run, may not be to his liking at all. Finding this out is as important as investigating the far-out chances of deliberate weather control.

Simulation and the WWW

The new meteorological era is unfolding mainly through two interdependent developments. It is reflected in the maturing ability of meteorologists to simulate mathematically the workings of the atmosphere. It is foreshadowed in the program to set up a global weather observing network.

Mathematical simulation is based on equations that embody the basic physical laws governing the atmosphere. Adapted for use in a computer, these form mathematical models of the atmosphere used for forecasting and studying how the atmosphere works.

Some models are very simple. They neglect most of the factors influencing the atmosphere. Others take account of such complexities as cloud cover, surface roughness, and heating and cooling at the ground. Over the past decade, such models have been refined enough to be used in forecasting, especially in forecasting upper air winds. But none of them today is more than a crude approximation to the real atmosphere.

Over the next decade, meteorologists expect to develop models that simulate the atmosphere closely enough to increase significantly the accuracy of long-range forecasting and to allow them to find out definitely whether and how man might exert some control over weather and climate.

To do this, meteorologists need computers at least 100 times faster than the fastest now available. These are on the horizon. What is more important, they need world-wide weather data.

Without these, no degree of sophistication in the mathematical models will do much good.

This all-important data-gathering system now is in the last stage of planning by member nations of the World Meteorological Organization of the United Nations. Called the World Weather Watch (WWW), it should be well established by the early 1970's.

Today, about 20 per cent of the Northern Hemisphere and perhaps 1 or 2 per cent of the Southern Hemisphere are adequately covered. To extend this coverage over the planet, WWW will use the traditional manned stations on land and ships at sea to some extent. Much of the new coverage will also come from satellites, from automatic stations on land, and from instrumented buoys at sea. Data for various levels in the upper air will be gathered by balloons. These will drift with the winds. Their buoyancy will be adjusted so that they remain at given levels.

This kind of coverage is the fulfillment of an age-old dream for weathermen. It is what they need to get a firmer grip on the forecasting problem and to understand the atmosphere better.

To aid research, the WWW will be supplemented by the Global Atmospheric Research Program (GARP). This now is being planned by the International Union of Geodesy and Geophysics. GARP will sponsor development of faster computers and specific model studies of the atmosphere. It will also gather data tailored to research needs.

Its most ambitious project will rival the International Geophysical Year. This is the Global Meteorological Experiment. In it, nations around the world will co-ordinate efforts to keep intensive watch on the atmosphere for several months to a year sometime in the early 1970's. Coverage will be dense, with observing units no more than 500 kilometers apart. Observations at several levels will be frequent, at least once every 12 hours.

At the very least, all of this effort should result in greatly improved long-range forecasts. That means long-range weather prediction maps as good as those now drawn up for a day or two in advance. The only question is how "long" this "long-range" forecasting implies.

Robert M. White, '49, administrator of the Environmental Science Services Administration which includes the Weather Bureau, says it may mean two weeks. When he stated this recently, some of his colleagues tried to talk him out of it. Some argued that good forecasts a week in advance are all that can be promised with reasonable assurance for the foreseeable future.

Others said that, in the ultimate, the limit on good long-range forecasting may be more like a month. But Dr. White sticks to two weeks and it probably is as good an estimate as any.

Weather Modification?

The prospects for weather and climate control are much more vague. This is continent-wide or world-wide weather modification, not localized rainmaking or hail suppression for which there are hopeful prospects.

Discussing this recently, Walter Orr Roberts, Director of the National Center for Atmospheric Research, explained that "the odds of our learning to control the weather on a continental scale are very, very small. On the other hand, as long as there exists a chance in 10,000 . . . the potential returns are so great we can't afford to neglect it." Because of this, he said, "The most important demand from the viewpoint of society that we can make on the computer is the investigation of the atmosphere."

Neither WWW nor the computer modeling of the next decade is likely to lead immediately to any degree of weather or climate control. But they should give meteorologists the tools to find out whether or not such control is possible.

All of this is tremendously challenging. But it may be that the most pressing aspect of that challenge will be found to lie in man's inadvertent modification of climate and weather through air pollution and urbanization. In the United States, Bosnywash and Santa-diego (the great urban stretches between Boston and Washington and between Santa Barbara and San Diego) symbolize these massive environmental factors. They are major pollution sources. They are areas in which paving is significantly changing the surface of the land.

No one knows what all of this does to climate and weather. But continent-wide hazes due to air pollution could have long-term effects. Increased cirrus cloud cover in some areas due to jet aircraft exhaust may also be significant.

Dr. Roberts may see things from the viewpoint of special interest when he calls weather research the socially most important use for computers. But he probably is right in saying that "by far the most likely weather modification factor today is large-scale air pollution." He reflects the feeling of many of his colleagues when he says he is "concerned about Bosnywash and the fact we don't know its effects." Certainly one of the biggest influences that is changing the face of our planet is man and this may include changing the planet's weather as well.

Review on Books

Is Anybody Out There?

By Joseph Mindel

Imagining other worlds has long been a pastime of poets and philosophers. Scientists used to take a hand in the game only at the risk of tarnishing their professional reputations—unless, of course, they wrote science fiction. It is different nowadays, when astronauts walk in space and the National Academy of Sciences issues an anthology on extraterrestrial life. Poor old Percival Lowell could not bring his Martian canals through the back door of astronomy, but new-found respectability has opened the front door to scientific speculation.

Two recent books are concerned with the existence of life elsewhere in the universe. *Intelligent Life in the Universe* (Holden-Day, San Francisco, 1966, 509 pp., \$8.95) is the result of an unusual collaboration, by mail, between I. S. Shklovskii, a Russian astrophysicist, and Carl Sagan, an American astronomer, and is based on Paula Fern's translation of the former's book, first published in 1963. *Intelligence in the Universe* (Prentice-Hall, Englewood Cliffs, N.J., 1966, 402 pp., \$13.50) by R. A. MacGowan of the U.S. Army Missile Command Computation Center and F. I. Ordway, 3d, a British writer on astronautics and extraterrestrial life, is different in major respects, despite the similarity in title. Both books, however, illustrate the contemporary approach to questions about extraterrestrial intelligence.

The procedure is to begin with the universe and descend in scale, describing the nature and origin of galaxies, stars, planets, the earth and, finally, life. The authors, particularly Shklovskii and Sagan, convey an astonishing amount of interesting, though not always relevant, information in such fields as cosmology, astrophysics, geology, atomic structure, communication theory, biological evolution and genetics. This elaborate background provides a perspective for understanding life on earth as well as a launching pad for the inquiry into the existence of extraterrestrial life.

If it is possible to describe the formation of life by the interaction of certain chemicals under certain conditions existing long ago in the earth's past, then the number of technical civilizations existing elsewhere in our galaxy can be estimated. To do so, it is necessary to know the mean rate of star formation; the fraction of stars

with planetary systems; the average number of planets in each system with environments favorable for the origin of life; the fraction of such favorable planets on which life does develop; the fraction of these inhabited planets in which intelligent life develops; the fraction of planets populated by intelligent beings on which a technical civilization arises; and the average lifetime of technical civilizations. The problem then becomes one of calculating the various fractions, that is, the probability of the occurrences in the chain.

Unfortunately, the probability calculations must be made on the basis of a very small sample. We know only one form of intelligent life that has evolved a technical civilization. This embarrassment is evaded by making what Sagan calls the "assumption of mediocrity." Man is not unique, the earth is an average planet and the sun is an average star. Now it is possible to assign numerical values to the fractions or probabilities. "From the frequencies of dark companions of nearby stars, from the argument on stellar rotation, and from contemporary theories of the origin of the solar system, we have seen that planets seem to be a very common, if not invariable, accompaniment to main sequence [sun-like] stars. We therefore adopt [the fraction of stars with a planetary system] $f_p \sim 1$." Similarly, with a few facts and much theory, Shklovskii and Sagan adopt values of 1 or 0.1 for the other fractions and 10 million years as the average lifetime of technical civilizations, and they reach the conclusion that there are a million advanced technical civilizations in our galaxy.

Sagan is aware that "the application of this method to areas where we have little knowledge is essentially an act of faith." He seems to be implying that probability estimates tend to be selected, consciously or not, so as to give final results consistent with a preconceived view. MacGowan and Ordway, using different probabilities, arrive at a figure 1,000 times as great as Sagan's. I suspect that it would not be too difficult to prove by the same method, with equal plausibility and validity, that there are no other civilizations, that man is unique after all.

This would appear to be a strange conclusion to derive from the assumption of mediocrity. But then, the assumption is not exactly what it seems. It appears to reject, with entirely appropriate humility, the anthropocentric image of man, overthrown by Copernicus, that nevertheless is often just below the surface of human thought. Disavowing uniqueness, we no longer insist that nothing else in the universe is like man. Proclaiming our

mediocrity, we say that everything else in the universe is like man.

If there are intelligent beings on another world, how can we communicate with them? What symbols can be understood by all intelligent life forms? Can we send a probe to make contact with such civilizations? Will we be able to travel in interstellar space? These are intriguing questions that have evoked ingenious plans and devices. It was enlightening and enjoyable to read about them in *Intelligent Life in the Universe*, in large part because the authors did not permit the wealth of detail to weigh down the tone and style of the book.

Intelligence in the Universe, which treats the same subject, is another kind of book. As the title indicates, the authors are concerned, not with intelligent life, but with intelligence. This seems like a trivial distinction, until it becomes evident that they mean exactly what they say. They believe that man will soon be able to build "intelligent artificial automata"; that there are many extraterrestrial civilizations in which such automata have been constructed; and that in such civilizations automata, because of their superior capabilities, take control over their creators.

The same course is not only inevitable on earth but also, it seems, desirable. "Many persons, especially scientists, have hypothesized that the domination of a nation, or the entire Earth, by a superintelligent automaton would result in slavery for the whole population. . . . Slavery, within the usual derogatory connotation, would not result from an automaton dictatorship. On the contrary, a relatively Utopian society would be the immediate result."

The authors' style is heavy, mechanical, and humorless; their illustrations often do not illustrate anything; they or their proofreaders allow an excessive number of misspellings to slip by; and in at least one paragraph the light-year is used as a unit of time. I might have been amused, but was not, by such remarks as ". . . it is almost impossible to imagine a habitable planet without trees of some sort." I might have been shocked, but was not, by such statements as, "Nuclear warfare could doubtless dispense with excess population, though no sane person would advocate it—at least not at our stage of evolutionary history." The authors take themselves so seriously that I found it difficult to take them at all.

Poets, philosophers, and scientists are equally entitled to the exercise of imagination. It is not certain which of them will have the first word with anybody that may be out there.



This wall was unbreachable...
until human error opened
the gates.



This plant was unburnable...
until human error lighted
the spark.

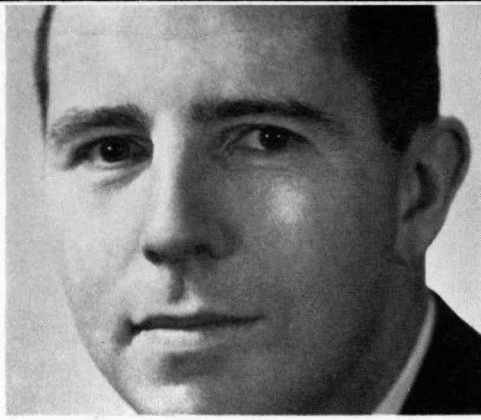
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Who's In Charge?

By Corbin Gwaltney

So many groups think they should have a voice in running America's colleges and universities—and behave accordingly—that the result is often cacophony, conflict, and chaos.

There are, to name the most vocal of aspirants to a governing role:

- *Faculty members.* Some uninitiated trustees, businessmen, and politicians may regard them as mere hired hands, but the teachers and research scholars on most campuses believe that history, logic, and circumstances support their view that they, the faculty, should exercise the real governing authority in their institutions.

- *The president.* He does, after all, possess the title that implies "boss" in most U.S. enterprises; is it not natural to suppose that the ultimate power to say yea or nay on the campus is his?

- *The alumni.* They are the products of the institution and therefore may be supposed to know (and love) it best. They are the group to whom the institution first turns for financial sustenance. They are usually organized, and the college often retains an officer and a staff to encourage their activities—so long as they remain harmless. Presidents and professors may come and go, but the alumni's relationship with alma mater is characterized by an everlasting constancy: lovers, but (in institutional governance) unloved.

- *Governors and legislators.* At some of the biggest, most populous colleges and universities in the land, these are the men and women from whom most blessings flow. Theirs is the job of making and approving budgets; they may also establish or repeal loyalty oaths, resist or yield to pressures threatening their states' centers of higher learning, and originate a few little threats and pressures of their own.

- *Churchmen.* Roughly 40 per cent of all American colleges and universities are church-related—drawing at least some of their financial support, and varying amounts of inspiration and guidance, from religious bodies. Can the churches claim a role in their educational institutions' government?

- *Federal officials.* Nobody, but nobody, hands out more money to colleges and universities these days. In return for the government's money, say many in Washington, is it not reasonable for government to exercise a measure of control over the universities—over their accounting procedures, certainly, and even over their admissions policies, at least to prevent

racial discrimination?

- *The students.* Who is more concerned than they with what goes on in a college or university? Who knows its true contemporary character—its promise and its shortcomings—more intimately? Who is better able to suggest remedies for the institution's present ills? No one, say the students—and growing numbers of faculty and administrators are disposed to acknowledge the rightness of a part of their claim.

- *The trustees.* Oh yes, the trustees. Theirs is the governing authority set by law. Theirs is the ultimate responsibility. Theirs is the splendid privilege of giving big money—enough to save the institution from disaster, if need be—and, say many, of keeping hands off the real machinery of operation.

A Call for Order

Considering that the picture drawn above is only slightly, if at all, exaggerated, it is easy to understand why institutions are at times caught in a cross fire of conflicting claims and interests.

Teachers bristle when politicians seem to be telling them what to teach and not teach—or whom they should admit to their scholarly ranks. Trustees bristle when their slightest motions in the direction of an institution's academic activities are resented, loudly, by faculty members. Students bristle when anyone—trustee, teacher, president, politician—dares to comment upon their manners, morals, or haircuts. Presidents, in the middle, must maintain a continuous state of bristlement, simply to preserve themselves.

One of the troubles is, and has long been, that on few campuses is each group's unique set of responsibilities carefully and precisely defined. If it is, nobody has succeeded in getting the warring factions' agreement on the definition.

Now an attempt is being made to ease the problem. Last month three of the academic world's leading organizations—the American Association of University Professors, the American Council on Education, and the Association of Governing Boards of Universities and Colleges—issued a "Statement on Government of Colleges and Universities" designed to define the role of three major groups involved in higher education's governance. Since each of the three organizations usually speaks for one of these governing groups—faculty members, presidents, and trustees, respectively—the joint statement may be taken as an important step toward bringing order to what is now, on many campuses, governmental untidiness and dissension.

The statement even presents its sponsors' belief that a fourth group—

the students—also should be involved in the running of a college or university. "When students . . . desire to participate responsibly in the government of the institution they attend," it says, "their wish should be recognized as a claim to opportunity both for educational experience and for involvement in the affairs of their institution. Ways should be found to permit significant student participation within the limits of attainable effectiveness."

But the principal governmental responsibility, in most institutions, must be shared by faculty members, administrators, and trustees. And, says the statement, it is important, today, that the three groups recognize their interdependence. Particularly, it says, everyone on the campuses should recognize the importance of being able to meet outside pressures—from political sources, for example—with a "generally unified view."

The trustees, says the statement, have "a special obligation to assure that the history of the college or university shall serve as a prelude and inspiration to the future." They should publish definitions of the institution's general policies and procedures. They should "play a central role in relating the likely needs of the future to predictable resources"—i.e., make sure that the long-range planning of the institution involves proposals that can be paid for. They should be ready to support the institution in times of crisis, protecting the president or the faculty or the student body if need be.

The trustees should delegate most of the day-to-day responsibility of running the institution, the statement says. They should, it goes on, "undertake appropriate self-limitation."

The president is the chief planning officer, says the statement; he should "innovate and initiate . . . [and] envision new horizons for his institution."

The faculty, the statement says, is primarily responsible for curriculum, instruction, research, "and those aspects of student life which relate to the educational process." Interference from the trustees and the administration should be kept to a minimum. Faculty status—appointments, promotions, dismissals, among other matters—is also a faculty responsibility. "Agencies for faculty participation in the government of the institution should be established at each level where faculty responsibility is present."

Will such a definition bring an end to sniping between interest groups? Of course not. Only by taking action on their own campus will each faculty, each board of trustees, each president succeed in creating the spirit of "interdependence" of which the educational associations' statement speaks.

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Puzzle Corner

By Allan J. Gottlieb, '67
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I have been so deluged with problems and solutions that I must actually save many for next time. But don't worry—eventually all will appear. And don't be discouraged—write to me at Box 4380, Baker House, 362 Memorial Drive, Cambridge, Mass., 02139.

Problems

21—First we have the following letter from Nicholas J. Pippenger, '67:

Dear Mr. Gottlieb:

It is, I feel, ironic that *Tech Engineering News* should feature a "Puzzle Corner" which inclines toward mathematical diversions. In an effort to correct this situation I offer the following original problem which, as far as I know, has never appeared in print:

A magnetic dipole $m\hat{x}$ is situated at the origin of cylindrical coordinates (r, ϕ, z) . A charge of q is situated at $(2, 0, 0)$. In a situation such as this it is well known that the Poynting vector does not vanish so there is an energy flux $\vec{S} = (1/\mu_0)\vec{E} \times \vec{B}$ and a momentum $\vec{P} = \epsilon_0 \vec{E} \times \vec{B}$ even though the configuration is entirely static (see, for example, Feynman's *Lectures Volume II*, Chapter 27). The problem is to find the total angular momentum of the electromagnetic field about the z axis; that is, find the integral

$$L_z = \int r \hat{\phi} \cdot (\epsilon_0 \vec{E} \times \vec{B}) dV$$

over all space. (Assuming q , m , and ϵ finite and nonzero, then L_z will be finite and not zero.)

22a—Don B. Zagier, '70, included a puzzle this time in addition to solving all the problems. He would like to know, given a regular n -gon $A_1 A_2 \dots A_n$ having the property that $1/A_1 A_2 = 1/A_1 A_3 + 1/A_1 A_n$, what is n ?

♦23—Doug Hoylman, '64, adds:

Here's an interesting problem that's not too difficult: Prove that

$$\sum_{n=1}^{\infty} 3^{-n^2}$$

converges to an irrational number. (The solution can be expressed in five words. This is one of the so-called Liouville numbers and can be shown rather easily to be transcendental.)

24—My favorite puzzle is the following sent in by Paul W. Abrahams, '56: Find the missing element in the following sequence (whose rightward continuation is undefined):

10, 11, 12, 13, 14, 15, 16, 17, 20, 22, 24, —, 100, 121, 10000.

♦25—The following challenge comes from Frank G. Smith, '11:

I have a problem that no one seems to want to tackle or even acknowledge: Two ladders 30 and 40 feet long are set be-

tween two vertical walls, the tops of the ladders on opposite walls. They cross at 10 feet above the horizontal between the walls. Question: How far apart are the walls?

This is not so easy as it looks. It requires some wangling with right triangles and it finally simmers down to a fourth power (diminishing power) equation to solve "a" in "b" and then get an answer. I can solve it only by trial and error to what I think is (in feet) accurate to about .01 per cent.

If you like my problem, I'll send you my method of solving it. But I expect you young mathematicians would have a better, more accurate way.

Let's see.

Speed Department

26—I received the following letter:

Dear Mr. Gottlieb:

I enjoyed your puzzle corner in the *Technology Review* for November, and will accept your invitation to submit puzzle suggestions.

There are three automobile tags. The first has two digits, the second has three digits, the third five digits. The number on the first multiplied by the number on the second equals the number on the third. The second divided by the first gives a whole number. All the digits from 0 to 9 appear on the tags. What are the numbers on the tags?

Yours truly,

Hubert duB. Lewis, '37

27—The final problem comes from Alvan L. Davis, '98:

Interpret the following sequence: "H I J K L M N O."

Solutions

8—Prove that for any even integer m greater than 2, there is an infinity of odd integers not the sum of a prime and a positive power (> 1) of m .

Don B. Zagier, '70, came close:

I can prove this only for $m > 6$, but in a more general fashion: the power of m can be 0 or 1 as well as > 1 . The argument is probabilistic (i.e., it is *probably valid*—Ed.). Assume that every odd number $> n_0$ is the sum of a prime and a power $(1, m, m^2, \dots)$ of m . Consider $n > n_0$. There are $[(n - n_0)/2]$ odd numbers z with $n \geq z > n_0$ (the $[]$ is the greatest integer function). There are $p(n)$ primes $\leq n_0$ ($p(x)$ is the number of primes $\leq x$). There are $[\log_m n] + 1$ powers of $m \leq n$. Hence there are at most $p(n) ([\log_m n] + 1)$ numbers of the form $p + m^k$, where $p \leq n$, $m^k \leq n$. Hence $[(n - n_0)/2] \leq p(n) ([\log_m n] + 1)$, so $n/2 - (n_0 + 1)/2 \leq [(n - n_0)/2] \leq p(n) ([\log_m n] + 1) \leq p(n) \log_m n + p(n)$ or $1/2 - (n_0 + 1)/2n \leq p(n) \log_m n/n + p(n)/n = p(n) \log_e n / \log_e m + p(n)/n$. As $n \rightarrow \infty$, $p(n)/n \rightarrow 0$, $p(n) \log_e n / \log_e m \rightarrow 1$, so we have $1/2 \leq 1/\log_e m$, or $\log_e m \leq 2$, $m \leq e^2$. Since m is an even integer, $m = 2, 4$, or 6 . Hence for $m > 6$, it is false that an infinity of odd numbers are representable as $p + m^k$ with p prime, m even, $k \geq 0$.

For the following I am indebted to the

Mathematical Association of America:
With $k > 0$, the odd number $m(m-1)^k + 1$ may not be written as $p + m^b$, p a prime, $b \geq 1$. Recalling that $m > 2$, it follows from $m(m-1)^k + 1 = p + m^b$ that $p \equiv 1 \pmod{m}$ and that $(m-1)$ divides p , i.e., $p = m - 1$, an impossible situation.

9—Show that there are irrational numbers s and t such that s^t is rational.

Check out the following:

Kid:

#9 is $e^{i\pi} = 2$

Courtesy of the Green Phantom.

Also solved by Mr. Zagier and Peter Groot, '68.

10—Assuming

$f(n) = \sqrt{n + \sqrt{n + \sqrt{n + \dots}}}$
converges for all integers n , show that given any integer y there is an integer n such that $f(n)$ converges to y .

Identical proofs were submitted by Mr. Zagier and Mark Yu, '70:

$f(n) = \sqrt{n + \sqrt{n + \sqrt{n + \dots}}} = y$, by convergence $\therefore \sqrt{n} + y = y$ or $n = y^2 - y$. Q.E.D.!

Mr. Groot also solved this problem and adds that y must be 0 or greater than 1.

11—For which positive values of a and c is $a^n \cdot n! > c \cdot n^n$ true for every positive integer n ?

Mr. Yu's proof is the most direct, but Mr. Zagier's is slicker (i.e., shorter): and so I will print his:

Take $n = 1$. Then $a^1 \cdot 1!$ must be $> c \cdot 1^1$, or $a > c$. To prove by induction, assume $a^k \cdot k! > c \cdot k^k$. Then $a^{k+1} \cdot (k+1)! = a(k+1) \cdot c \cdot k^k = a(k/(k+1))^k < (k+1)^{k+1}$. If this is $> c(k+1)^{k+1}$, a must be $> ((k+1)/k)^k$. This is true if $a \geq e$. Hence, if $a > c$, $a \geq e$, then $a^n \cdot n! > c \cdot n^n$ for all n .

12—What is the largest number of queens which can be placed on a chess board such that no three queens lie in a straight line. Any solution greater than 14 will be printed.

Chesley E. Osborn, '67, Hugh J. Vishner, '70, and Mr. Zagier each sent in one solution with 16 queens, but Mr. Groot sent in 72 solutions.

I have received several letters since my January column went to the printer; thus I can only mention their names here. Eric Rosenthal, ('73?) solved problems 1, 3, 4, 6, and 7. (By the way, Eric, your solution to 6 was cool.) Eric's father, Meyer S. Rosenthal, '47, solved 5. What a family! Why didn't you get Mom to tackle 2? Paul W. Abrahams, '56, solved 1, 2, 4, and 6. Frank G. Smith, '11, sent to me a solution to problem 6 plus a Christmas card; thank you. James H. Michelman, '51, solved 1. Problem 5 was successfully attacked by M. E. MacGregor, '07, and number 2 fell to Paul Langacker, '68, who reads TR, not TEN.

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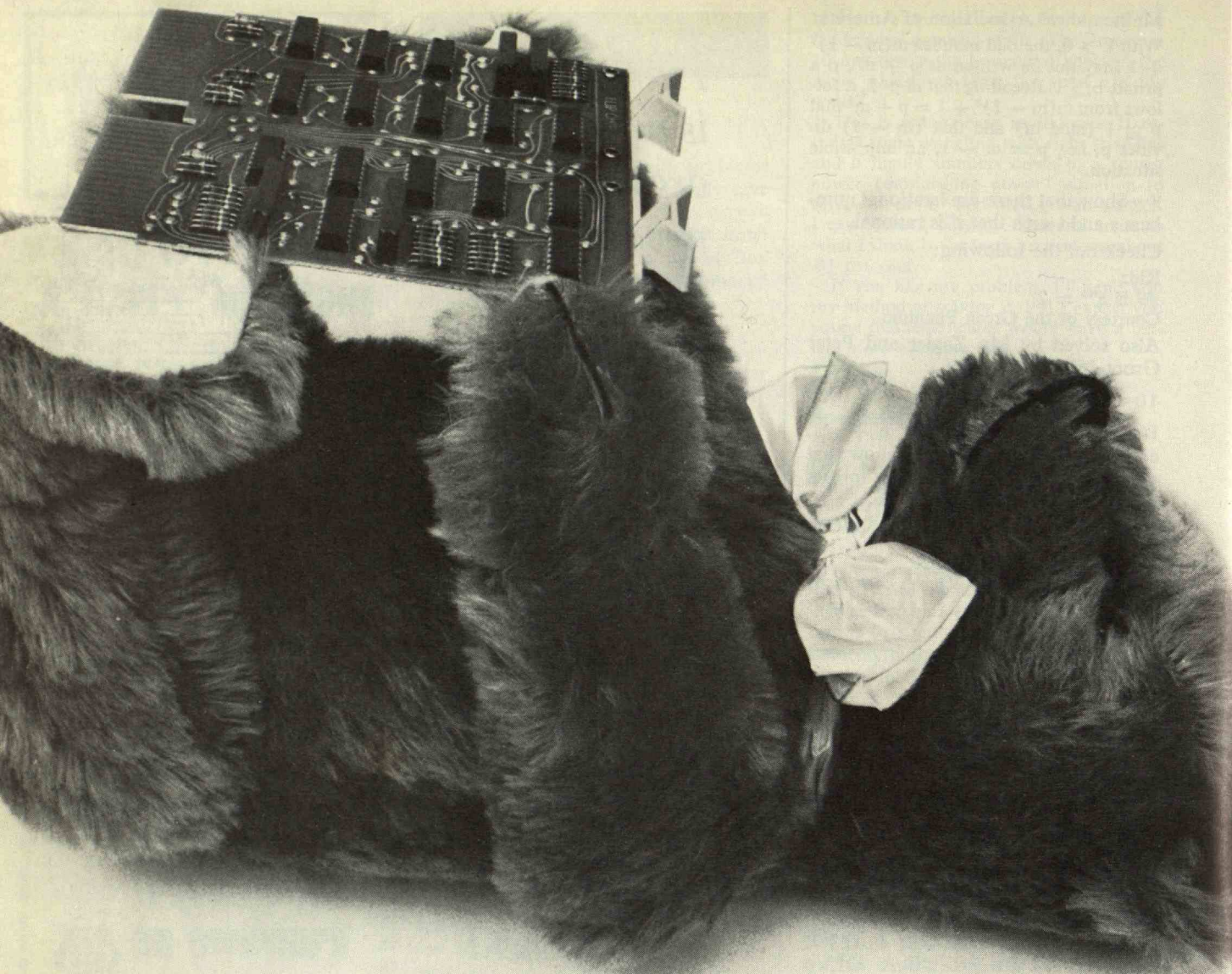
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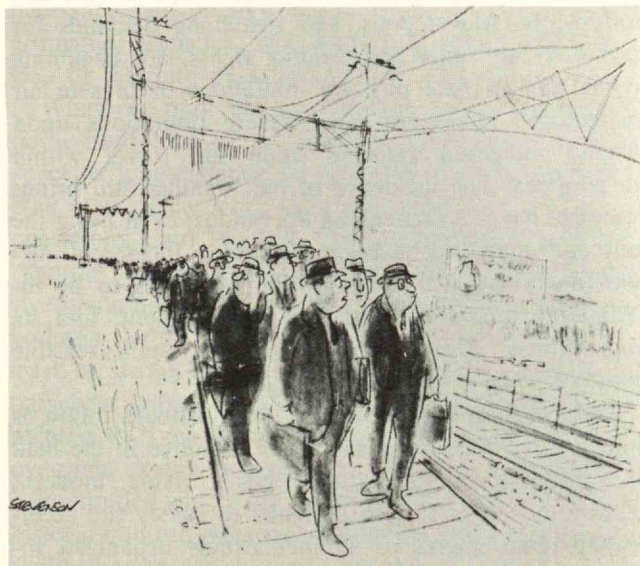
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Rail Passenger Service: The Iron Horse Must Stay!

The future of our urbanized society
depends upon creative revitalization
of intercity railroad service

By William H. Tucker and Robert M. Glennon

DRAWING BY STEVENSON; © 1965 THE NEW YORKER MAGAZINE, INC.



"I just never imagined they wouldn't finally come up
with some form of government aid."

In April, 1965, during the Interstate Commerce Commission hearing on the first of two major train discontinuance cases of the New Haven Railroad, *The New Yorker* magazine published the cartoon on this page which perfectly reflected the dilemma of New York's commuters. The familiar rails, ballast, and ties were underfoot, and the familiar electric power lines were overhead—but the familiar trains were gone.

New Yorker cartoonist Stevenson's thrust was presumably at the New Haven Railroad, on whose proposal to discontinue 105 of its New York commuter trains the ICC was then conducting hearings; and surely there was lurking in the background the threat of total collapse of the railroad and all of its passenger service.

One of the issues in the New Haven train-off cases was the question whether there is any reasonable alternative to New Haven's commuter operations. *The New Yorker* cartoon's point was ultimately confirmed by the ICC's findings: there *is* no rational alternative.

The cartoon's suggestion that these early morning suburban marathoners were almost resigned to their fate, even if they were incredulous at it, is no laughing matter. Indeed, as a public policy, the abandonment of an urban mass transit facility where it is available and being relied upon by 30,000 daily commuters, would be a wholly unacceptable decision.

But that conclusion only reaches the threshold of the really relevant issues.

The real danger is that public policy *will* accept and try to live with a passenger service—both within and between our metropolitan areas—at a level of adequacy lower even than present requirements—and, even if patched up and pieced together from time to time, a service which consistently lags behind the now predictable, unavoidable needs of the near future.

This result must not be allowed to occur.

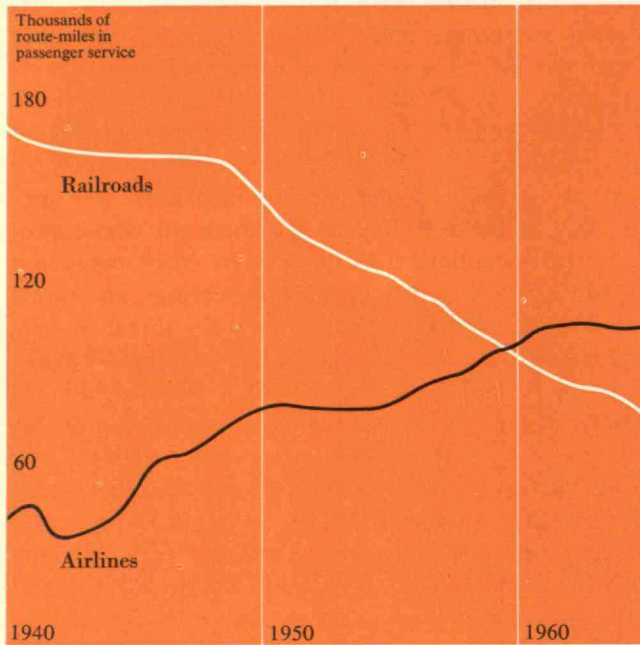
The scope and quality of future railway passenger service represent at least as important a national domestic issue as any other this country will face in the next decade.

We have, for example, a too deeply rooted national tradition teaching that our intercity rail passenger service is moribund and must finally die. The time has come to re-examine that tradition and do all that is necessary to reshape its course for the years ahead.

While airline and highway technology, capacities, and utilization have enjoyed phenomenal development and growth in the past 30 years, railroad passenger service as a whole has moved into nearly total eclipse. But it has not yet disappeared. Today there is a new need and a new opportunity to give it life and purpose.

Senator Claiborne Pell's recent book, *Megalopolis Unbound*, achieves a remarkable summary of the circumstances, the trends, and the possible alternatives which face the people of our rapidly urbanizing society.

The demand for transportation in the U.S. is very high, and it will continue to increase significantly in the coming years. Meanwhile, the railroads' share of America's passenger transportation service continues to decline.



Megalopolis, the urbanized corridor extending along the East Coast from southern New Hampshire to northern Virginia, houses 20 per cent of the nation's population on about 1.4 per cent of its land. It accounts for about 20 per cent of the nation's employment and one-third of its wages and salaries. The scale of intercity travel within this area already is at a much higher level than any other region.

Precise records of passenger travel are not available to show exact comparative uses of highways, rails, and air lanes between particular cities within Megalopolis, or elsewhere. Statistics for 1962 indicate that a total of about 5 million people flew between locations within the northeast corridor in private, commercial, and military flights. Records of domestic airline travel in that same year show that approximately 2.4 million passengers flew in the two leading "city-pair" markets in the corridor, Boston-New York and New York-Washington. That total represents a rise of 28 per cent over the 1960 level. In turn, the 1965 totals for these markets, 3.6 million passengers, show a further rise of 50 per cent over 1962 levels. The introduction of "air shuttle" service between these cities in 1961 has led to this enormous increase in passenger volume.

There are no comparable statistics for rail passenger travel. As a rough contrast, the New Haven and Pennsylvania Railroads, the primary carriers along the Boston-Washington corridor, in 1962 transported totals of 12 million and 26 million non-commuter passengers, respectively. All of the New Haven's and many of the Pennsylvania's passengers traveled inside the corridor, but their origins and destinations were not recorded. In years subsequent to 1962 these totals of passengers carried have remained fairly constant for both the New Haven and the Pennsylvania.

Statistical projections developed by the Regional Plan Association of New York indicate that more than 150,000 passenger trips are made each day between the New York metropolitan region and other metropolitan areas in the northeast corridor. Its estimates for 1964 were that 4,800 auto passengers traveled each weekday between New York and Washington and 5,500 between New York and Boston. Comparable bus travel figures were 2,900 passengers between New York and Washington and 1,150 between New York and Boston. It estimates that 1,550 passengers traveled by rail and 3,300 by air between New York and Washington; and 1,300 by rail and 4,250 by air between New York and Boston each week day in that year.

It is not difficult to foresee an enormous increase in this kind of movement within Megalopolis when you consider the population here will increase by about 30 per cent in the next 20 years. A Bureau of Public Roads study a few years ago predicted that intercity travel generally could increase by 58 per cent in 1970 and 133 per cent in 1980 over 1961 levels.

Trends evident in the northeastern corridor make it clear that unless a dramatic change is effected our first Megalopolis, and others to follow its lead, will eventually strangle its necessary mobility in unending ribbons of concrete and overcrowded airline traffic.

In terms of safety, speed, and economic and social cost, the proliferation of superhighways along the 600-mile northeast urban zone is not an adequate answer for predictable increases in intercity passenger travel. The economic cost alone of widening existing superhighways is becoming prohibitive. Senator Pell points out that it will cost about \$300 million to widen a 30-mile stretch of the New Jersey Turnpike near New York City. The cost will be about two-thirds the total cost of the entire 132-mile highway in 1952.

Air lanes and metropolitan airfields already are congested in the northeast corridor, which has a far more dense concentration of air traffic than any other part of the country. Rising use of commercial and private aircraft within Megalopolis, and tightening demands for peak-hour air space and landing rights, are beginning to tax the absolute physical limitations of present air technology. There are other severe limitations upon placing increased reliance upon air travel within Megalopolis. The incidence of bad weather still brings complete havoc to scheduled operations, even using the most advanced technology available. Incidental airport-to-city ground transportation continues to be inordinately time-consuming and inconvenient, and its improvement depends almost entirely upon feasible improvements in urban mass transit.

The direction national public policy should follow is quite clear. As much as any other objective in the field of transportation, the nation needs a viable, modern, railway passenger service designed to satisfy the accelerating requirements of an increasingly urbanized society. By 1980 more than two-thirds of our population will live in about 25 compact urban zones around the

country, located in a total of about 10 per cent of the nation's land. Thus the travel limitations facing the northeastern Megalopolis will continually repeat themselves elsewhere, if they are not dealt with now.

Adequate railway passenger service for the future doubtless must include the provision of rapid commuter transit within individual metropolitan areas.

It must also embrace both a vastly improved medium-range, high-speed intercity train service within the conglomerate megalopolitan zones, and a basic core of long-distance trains connecting the megalopolitan areas to each other in overnight service.

In many metropolitan areas substantial progress is evident in the planning, financing and building (or upgrading) of rail facilities for mass transit as parts of comprehensive programs balancing highway and railway needs. Increasingly, local area governments have come to appreciate that they must contribute a reasonable level of support for this service, as the particular circumstances in each area may require.

To bring our intercity travel even to a minimal level of adequacy, however, will require a major new infusion of techniques, equipment, and imagination. As an essential element in this effort each passenger-carrying railroad should undertake a thorough re-examination and replanning of the entire structure of its passenger operations. With the aid of all available contemporary market analysis capabilities, each railroad should ask itself fundamental questions:

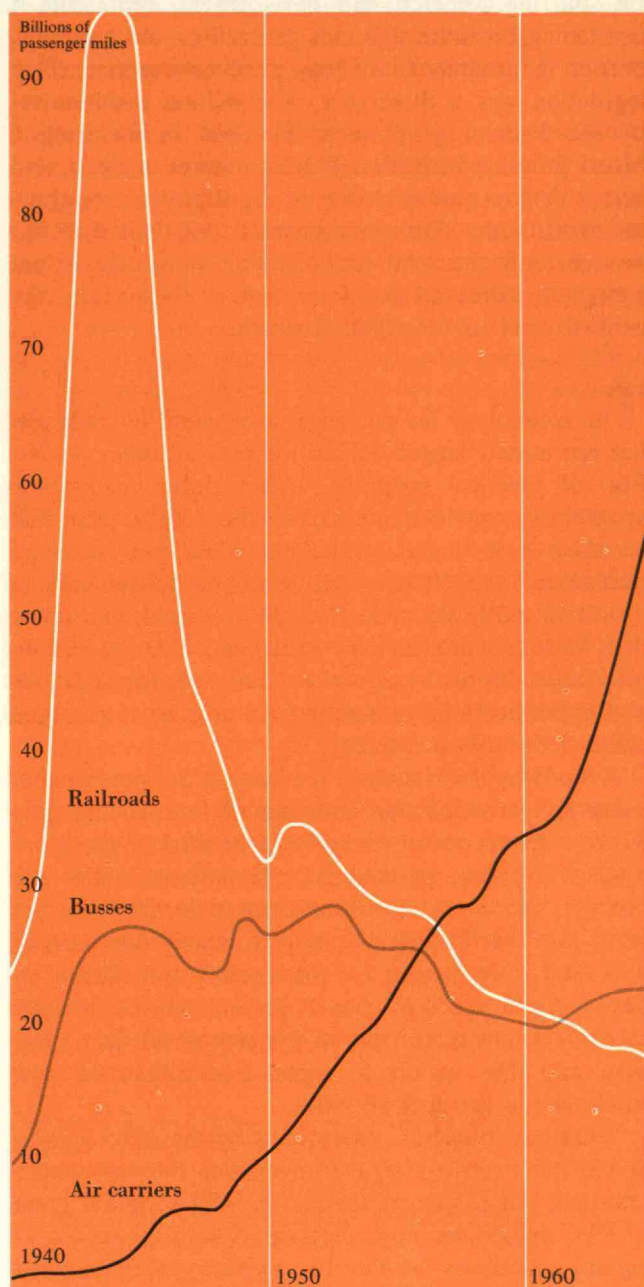
- What service is really needed?
- What amount of pruning of unproductive and unneeded schedules would be justified?
- What kind of investment would be needed to modernize the remaining operations?
- To what extent would public support be necessary and justifiable to sustain and upgrade essential passenger operations?

Only such an effort, vigorously pursued, and, where necessary, performed in co-operation with affected governmental agencies, will lead to a sound rationalization of intercity passenger-service structure.

Whatever may be the ultimate merits of the proposal itself and of its negative implications with respect to long-distance service, the recently announced plan of the New York Central to reshape its passenger operations into a "no frill," intermediate-distance, "shuttle" operation represents the kind of comprehensive planning that should be stimulated. Our public hypothesis should be that we will need, by the 1970's at least, a strong network of high-speed, medium-range, passenger trains—of the Tokaido Line genre—supplemented to some degree by a viable core of long-haul, overnight trains between the emerging megalopolitan communities and to and from primary sites of national historic interest. As soon as possible, such a hypothesis should be thoroughly tested by objective and searching analyses of all the relevant facts.

Planning for improved railway service will have to

The role of the airlines in domestic intercity passenger traffic in the United States has increased spectacularly in the present decade. But are we now laying the foundations for systems which will effectively meet our future needs?



be supplemented by improved technology. The enactment late in 1965 of President Johnson's High Speed Ground Transportation Bill, with its heavy emphasis on spurring research and development, represents a heartening breakthrough in a generations-old economic barrier to progress in railway passenger service. That legislation was a three-year, \$90 million commitment by the Federal government to assist in financing a broad program of basic research, market analysis, and actual demonstration testing of rapid ground transportation methods. The commitment is not limited to rail service, and the total authorization obviously is not enough to solve all problems, but it does assure the needed start in the right direction.

The technology for passenger movement by railroads has not merely lagged behind the pace of other modes. For all practical purposes, it has never really progressed beyond the depression of the 1930's. That fact becomes even more compelling when you consider that more than 60 per cent of rail passenger cars in operation today are more than 30 years old, and fewer than 4 per cent are less than seven years old. Since 1956, total expenditures by all Class I railroads for additions and betterments in passenger-train cars have averaged about \$30 million annually.

A study by the National Academy of Sciences several years ago revealed that railroads were spending only \$7 on research out of every \$10,000 of their gross operating revenues. In contrast, the national outlay for research and development activities in recent years has stood at about \$15 billion. Approximately one-third of that total is performed for the aircraft and missile industry. Commercial airlines at present reinvest in their own operations more than 85 per cent of all their earnings, and they expect to spend \$14 billion on new equipment in the next 10 years.

What has truly been established by the 1965 legislation is the means to begin to overcome the vast inertia retarding rail passenger service. A pilot program grant of \$9.6 million for upgrading the New York-to-Washington operations of the Pennsylvania Railroad has been met by an investment of more than \$36 million by the Pennsylvania Railroad itself. The result later this year will be a vastly more attractive service between these vital centers at speeds up to 110 miles an hour. A complementary experimental program already has been authorized for trial on the lines of the New Haven on the northern side of the northeast megalopolitan corridor. In this program a \$2.1 million commitment by the Federal government will be met with a \$500,000 commitment by the state of Connecticut for a one-year testing of the newly designed, lightweight gas-turbine-powered trains. The initial objective is to reduce the Boston-to-New York elapsed time by one hour, thus to a three-hour-and-15-minute schedule.

President Johnson, specifically recognizing that intercity passenger movements will double in volume in the next 15 years, has said that technological advances

made in the northeast corridor experimental programs will be directly applicable to other regions. Under the High Speed Ground Transportation program in the past few months, the Department of Commerce has awarded research and development contracts to a number of operating companies and research institutions around the country to study various technical factors essential to future high-speed railway operations, such as roadbeds, tracks, power catenary systems, electric motors, and the dynamic behavior of trains at high speeds.

The long decline in railway passenger service has revealed a virtual withdrawal by the railroad industry from any long-range commitment to performance of these operations. But there are current indications that, with enlightened federal assistance and a new public acceptance of appropriate responsibility to provide reasonable support for essential rail passenger service, the railroad industry may willingly join the ranks for a long-range reinvestment in, and reshaping of, a basic core of essential rail passenger service. For example, Stuart Saunders, Chairman of the Pennsylvania Railroad, has recently affirmed his company's commitment to modernizing railway passenger transportation, saying:

... that the Pennsylvania Railroad is definitely interested in preserving and improving passenger business. Our goal is to produce faster, more convenient, more comfortable and more efficient passenger service which is better suited to the needs of the public than it is today.

We on the Pennsylvania are prepared to work with governmental agencies on local, state and federal levels to achieve this objective. We are convinced that the railroads can make a vital contribution to a new era of passenger service . . .

Just as there is a need for firmly redirecting our national attitudes concerning the utility and essentiality of rail passenger service for the next decade, the time has also come to re-examine certain primary regulatory devices affecting the shape and future of rail passenger service.

In 1958, the operations of Class I railroads recorded a total of 246 million passenger *train-miles* and a total of more than 23 billion *passenger-miles*. By 1965 the level of such passenger operations had declined to 178 million passenger *train-miles* and 16.8 billion *passenger-miles*, a decline of about 30 per cent in each instance. The statistical passenger deficit declined from \$723 million for 1957 to \$410 million for 1965.

Furthermore, it is apparent that, with the many railroad corporate unifications that have taken place, the operating innovations made effective, and the new marketing techniques employed in a steadily growing national economy, the railroad industry enjoys comparative economic health as well as strong prospects for continued growth. The "railroad emergency" of the 1950's has receded substantially, and, more important,

the emergency train-off procedures which were then enacted by the Congress do not now measure up to the present situation's developing needs.

While we know that hundreds of passenger trains have stopped running since 1958, and we can measure by total statistics the declining use of passenger service as a whole, there is no realistic method available to tell us exactly where we now stand in terms of realistic needs, prospects, and potential of intercity railway passenger service. The tendency in the usual case before the Interstate Commerce Commission is to remove particular trains whenever the cost and revenue data seem propitious, with no well-conceived plan to account for the consequences on such things as feeder revenues, remaining through connecting train operations, or the remaining market requirements in the area affected.

This procedure needs to be revised to provide more flexibility for both the carriers and the ICC to bring about whatever changes may be necessary to strengthen and co-ordinate the entire structure of a carrier's passenger service, balancing relevant factors such as the carrier's financial and operating condition, the needs of the public, and the willingness of the public to provide reasonable support for the rail service.

In this context, the Findings of the ICC in the second New Haven train discontinuance case bear repeating.

In addition to providing the interim solution for New Haven's particular situation, the Commission concluded that just as the railroad has an obligation to sustain and improve essential rail passenger service, the public has an obligation also to provide its support, stating in the New Haven case:

... that the reasonable level of public support should in fact be construed as that level of financial or other public assistance which will stimulate the carrier to initiate or, if already initiated, continue its own reasonable effort to sustain and improve essential and economically viable passenger services. This, we think, is the kind of creative co-operation which will most productively revitalize and invigorate the operation of America's privately-owned rail passenger operations.

Such a policy places appropriate responsibility upon both the public and private sectors. It also provides a definite basis for the Commission to scrutinize carefully the good faith and efficacy of the co-operative efforts of all the parties to future train discontinuance proposals.

One of the most impressive facts that comes to light from a survey of discontinuance proceedings is the railroads' glaring lack of precise data as to actual costs of particular schedules and relevant market factors. Cost accounting practices vary widely among our nation's railroads. Only a comparative few maintain and analyze records which define the actual costs in any reliable manner. In most instances railroads are content to rely upon statistical apportionments of their basic costs for their entire system, rather than to analyze performance records of particular trains, even if such

records are maintained.

The remarkable fact is that too few railroads seem to know what it *really* costs to conduct particular train schedules or segments of passenger operations, as opposed to "average" costs, although exceedingly important management judgments are founded upon this kind of cost information.

Along with more sophisticated cost analyses must come a more conscious and knowledgeable use of modern marketing techniques. It is astonishing to find, as we do all too often in passenger train-off cases, that the carrier has no clear idea of the patterns of passenger utilization of its service, except perhaps for an occasional short-term study undertaken with train discontinuance in mind. This situation must be reversed if future judgments regarding train service are to be soundly based.

The important consideration at this stage, of course, is not whether the rules or procedures have been correctly applied in the past, but whether they are reliable for the future decision-making. The public policy issues revolving about rail passenger service—including the fair and accurate determination of and responsibility for its costs—are too important to leave to guesswork.

The passenger cars of our railroads traditionally have been the "windows" through which the public has observed and judged the strength and competence of the whole railway system. That tradition will probably continue. Henceforth, it seems probable, these trains will also become windows to the vitality of our entire urban society. The coming years therefore present an unavoidably important challenge to the pride and initiative of our private ownership railroad industry, and to the inventiveness of our public policy. That challenge must be met. ■

William H. Tucker (left), a former Boston lawyer, is chairman of the Interstate Commerce Commission, having served as a member of the Commission since his appointment by President Kennedy in 1961. He conducted the public hearings on the ICC's investigations of the New Haven Railroad's proposals to discontinue its passenger services. Robert M. Glennon (right), also a lawyer, has served on Mr. Tucker's staff since 1961 and has had extensive experience with passenger train discontinuance cases and related railroad matters. This article is based upon a paper originally delivered by Mr. Tucker before the New York Railroad Club.





Man in Space— The Gemini 12 Report

The first M.I.T. astronaut relates the particular achievements of the last mission in the Gemini series

Just before 3:00 P.M. EST on November 15, 1966, Captain James A. Lovell, Jr., and Major Edwin E. Aldrin, Jr., '63, stepped onto the red carpet of USS Wasp. They had just completed 94 hours 36 minutes in space in Gemini 12, and had set the final seal of success on the Gemini program.

Although beset throughout the flight by minor problems, the astronauts successfully achieved nearly all the flight's objectives. In spite of radar failure, they rendezvoused with the Atlas-Agena target vehicle within three orbits, simulating the rendezvous required for a lunar flight, while Aldrin's two hours and nine minutes working outside the spacecraft diminished doubts on the ability of astronauts to work in space, which had arisen on earlier Gemini flights.

"Buzz" Aldrin, now promoted Lieutenant Colonel, followed his father (Edwin E. Aldrin, '17) to M.I.T. There he worked on orbital mechanics and produced a doctor of science thesis entitled "Line of sight guidance techniques for manned orbital rendezvous." Already interested in becoming an astronaut, he dedicated the thesis to "the men in the astronaut program."

On the Gemini 12 trip, Aldrin's interest in orbital rendezvous took on particular significance during the spacecraft's third orbit. Coming up to rendezvous, the Gemini 12 radar locked onto the target at a distance of 235 miles. However, as the craft approached the target, the astronauts suddenly realized that the radar had failed. They were thus forced to use radar backup procedures; although they had practiced these extensively in pre-flight training, they had hardly expected to have to use them. This is how Colonel Aldrin described the events in the pilots' report in connection with the post-flight press conference:

I would like to stress that this is the first and only time that the primary rendezvous has ever been accomplished by use of backup techniques. All of the crews have become quite familiar with the procedures and we've gone over them at the McDonnell simulator many many times, but this is the only time that they have actually been used. I might say that the solutions that we got were extremely close. I actually think that the maneuvers that we made were more accurate than those that were given to us by the ground. The subsequent corrections that we made after the initial transfer maneuver now bore out just how accurately this initial maneuver was.

He then went on to describe the next important objective of the flight—his extravehicular activity (EVA): I am sure that you are all aware that things went quite well, and of course, we were very well satisfied with the progress of the EVA. As a matter of fact, things went quite a bit smoother than I had actually thought they would. We had to anticipate many many problems that could arise and it was just through continual training and going over these procedures that we were able to learn what these pitfalls might be and how to avoid them. And we didn't run into a single problem that gave us any particular trouble.

Edwin E. Aldrin, '63, pilot of the Gemini 12 mission, brought a unique background of advanced academic preparation in M.I.T.'s Department of Aeronautics and Astronautics to his Gemini assignment. This photograph was made while he was checking out the spacecraft before the flight during a simulated test on Complex 19 at Cape Kennedy.

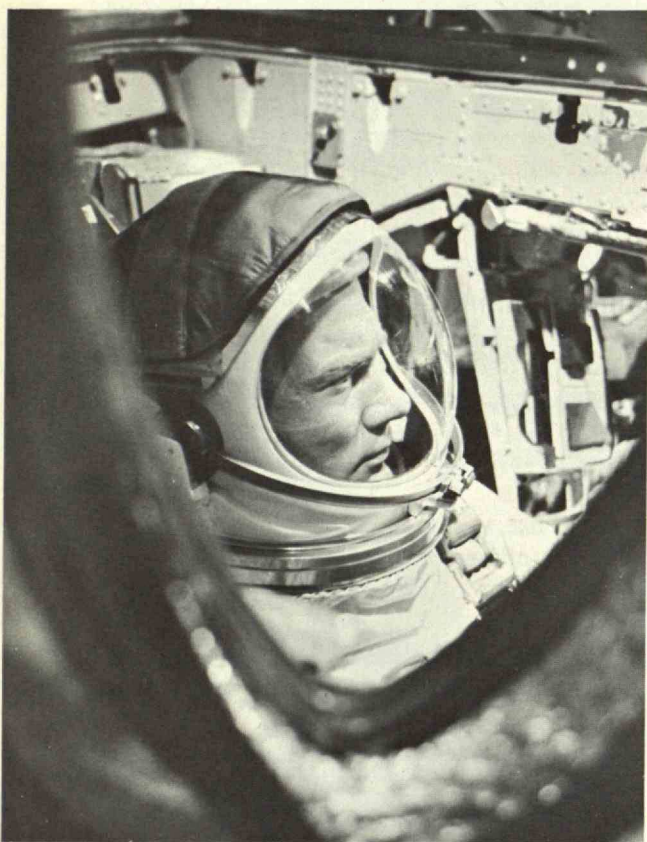


PHOTO: NASA

I would like to contrast in a way the preparation for EVA with training required for launch, rendezvous, or re-entry. In these other phases of the mission, I think we have been able to establish simulators and create the situation very accurately. And each flight crew coming back has reported how closely the simulations agreed with what was actually found in flight. Now extravehicular activity is completely entwined with a zero-g environment and, of course, it is impossible to set this environment up here on the surface of the earth. So EVA was an example of a phase or particular portion of the mission for which we just had to go up into space to find out what the situation was and what techniques were really required.

I think we have found out, since some of the early work in EVA discovered that the training afforded by underwater simulations is going to stand us in very good stead in the future. I was quite happy to find out that the dynamics, the behaviors, the situation that I was confronted with in space had been very well duplicated in the simulation that I had on the ground.

I would like to stress that the work we did and were able to accomplish in EVA was the result of a vast team effort. We made use of all of the experiences of the previous crew members on previous flights. Our support team spent long hours preparing the mockup and we certainly spent a considerable amount of time going through EVA preparations.

During the flight, we had three periods of EVA: two standup EVA's, where I was using either just the spacecraft hoses or an extension hose, and an umbilical EVA. We decided to place one of the standup EVA's first, primarily to afford me an opportunity to become familiar with what it was like to be standing in the open hatch and to push against it gradually just to see how much my body would move, and also to get exposed to the environment of the vacuum. And I am quite glad that we did schedule this first.

During this first period we were primarily concerned with taking pictures at night of various starfields. In the day period between the two night periods, I used this to familiarize myself with the zero-g environment. During this day period I recovered a micrometeoroid experiment attached on the retro adapter behind the cockpit. We had quite a problem with the tethers. We didn't want to lose anything so everything had to have a tether attached to it. We were originally going to run a tether across from the inside of the cockpit to attach to the micrometeoroid experiment but came up with the idea of putting it right on the hatch instead.

I mounted the camera that took some of our pictures several times just to become familiar with task. I was trying to store up a knowledge of how things behaved when I was on this short-hose configuration, so that I could compare this with the situation that would exist on the second, umbilical, EVA.

I noticed one peculiar thing during one of the night passes while I was using the shutter release cable, and I think we might want to look into this a little bit and find out what caused it. While I was rubbing my fingers

together, I could notice in the dark a very faint glow between my fingers.

The umbilical EVA was divided essentially into three phases, a day phase, a night phase, and another day phase. Now, the first day phase was originally spent in the area of the hatch first mounting the camera several times to compare this with how I had mounted the camera on the previous EVA.

I then moved up to the Agena area and made use of the waist tether restraint system that we had devised. This consisted of two flexible tethers that were attached to my parachute harness. I connected these hooks into two different rings—one on the telescoping handrail that I installed and another on the docking cone of the Agena. The purpose of the handrail was to offer a different means of progressing from the hatch to the Agena. On the two previous times that people have tried to do this it has taken two attempts, and rather than show how it might be done without missing again, we wanted to take the conservative approach and just look at an alternate means of doing it. With the waist tether restraint system I was able to ignore completely where my body was going because I knew it wasn't going very far and I was going to be able to devote my full effort to the work task that I had.

The first task was to take the tether that was on the Agena and hook it up to the docking bar of the spacecraft. This worked extremely well, and then I put the hand clamp above it to keep the tether down lower. I then moved the waist tether restraint system to a new location and deployed the micrometeoroid experiment that had been placed on the Agena (the S-10 experiment). I didn't experience any particular difficulty doing this, so then I moved the waist tethers to a new location and started to prepare the work station that was on the Agena, to give more time to devote to this when I came up after the next night pass. As time moved on I started moving back toward the adapter and handed in the camera to Jim and picked up the camera I was to use back in the adapter work station.

Back there we had rigged up several different connectors and hose connections, and hooks and rings—just basic tasks to be done, not necessarily important tasks but merely designed to evaluate the restraint system that we had established. This system contains foot restraints, or "golden slippers," and there is really nothing better than this type of restraint system. The situation is very similar to just being in one g environment; the only difference is that the things you are working with with your hands tend to move around in a way that they don't in one g. After establishing that these foot restraints were as good as we'd hoped that they would be, I then took my foot out of them and did some work in the waist tethers.

The next day's pass was spent up on the Agena using a torque wrench. This allows you to build up to a certain torque force as you're tightening a bolt or whatever it is; when you reach a certain torque value it releases rather suddenly, and you can build up to the value again and continue the process. We were a little concerned that

Not the sun, but the star Sirius, shining beyond the nose of the Gemini 12 craft. The streak opposite this star represents its ultraviolet spectrum. Since this radiation cannot penetrate the earth's atmosphere, such spectra can only be studied from space. The spectra obtained by Geminis 11 and 12 were the first to resolve spectral lines between 2000 and 3000 Å in any star apart from the sun.

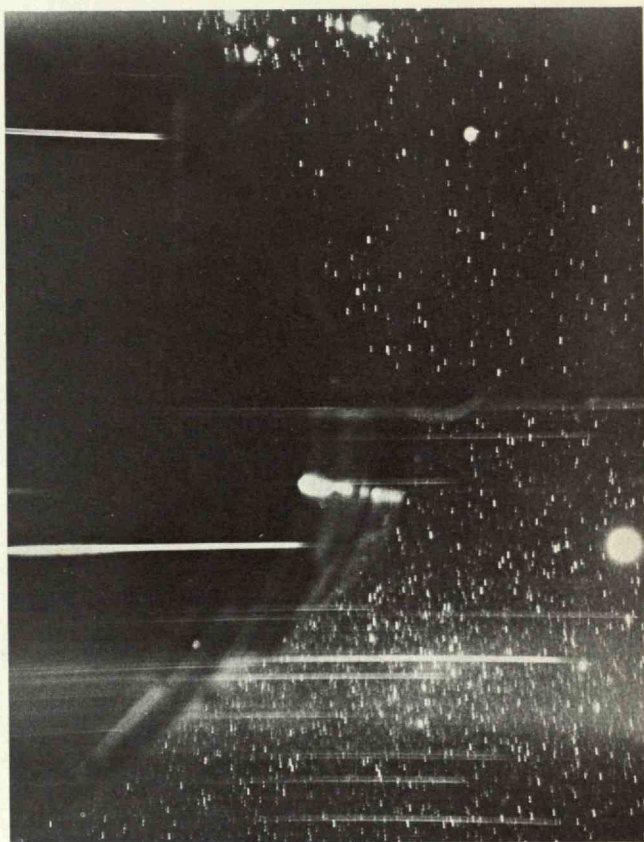
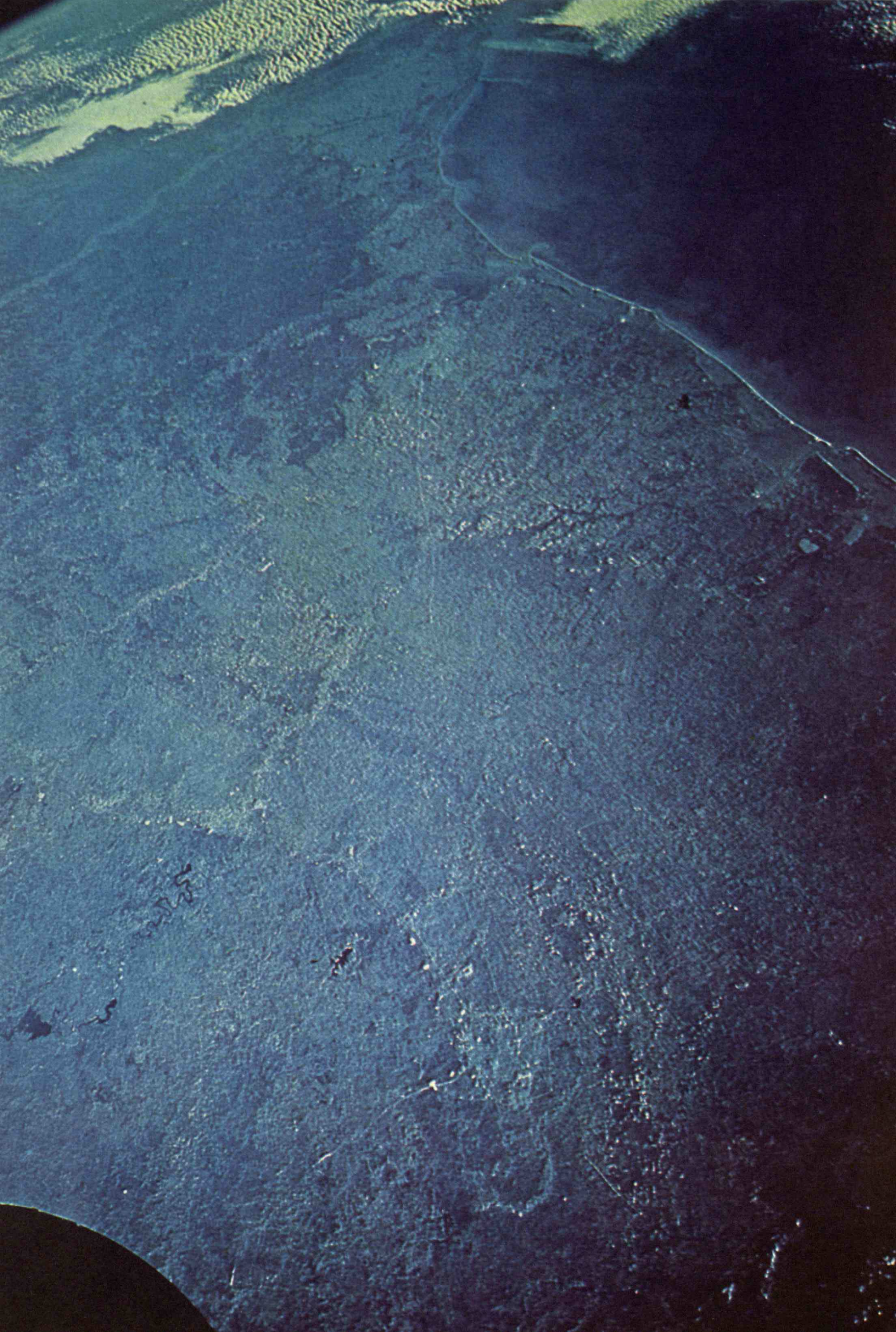


PHOTO: NORTHWESTERN UNIVERSITY



doing this EVA might lead to rather large reactions of the body but we found that this was just not true. It behaved in a very close fashion to what we had experienced underwater. You can get by with rather sudden actions, which seemed to be absorbed in the suit and just in your muscles. They produce a slow motion in the body but then you can take the time to reposition yourself and to overcome this reaction.

I'd hook up the waist tether to give me a two-point support, and then as I pushed my hands against what I was working with, my feet came in contact with the Agena and this gave me an excellent four-point contact. And with these four points I was able to counteract any torque forces that were created by any particular work task that I was doing.

I did some of the same torquing and connecting and disconnecting activities without waist tethers. It can be done this way, but you just don't have the same confidence and freedom to go about the action, because you know that if you start to move out of position, you've got to stop what you're doing and re-establish the position.

To summarize the lessons of our EVA on this flight: first I think we learned the great value of a restraint system. In order to perform a task in EVA, we first must take the time to set up a restraint to the body that will substitute for the one g that we have down here where our feet are in contact with the ground. We have to fix the body in a position where we can devote our entire effort to the task at hand.

The second lesson I think we learned concerns the value of the underwater training that we had. [*This training started just before the Gemini 11 flight.*] This was extremely valuable to us in letting us go through the entire time line of the EVA mission.

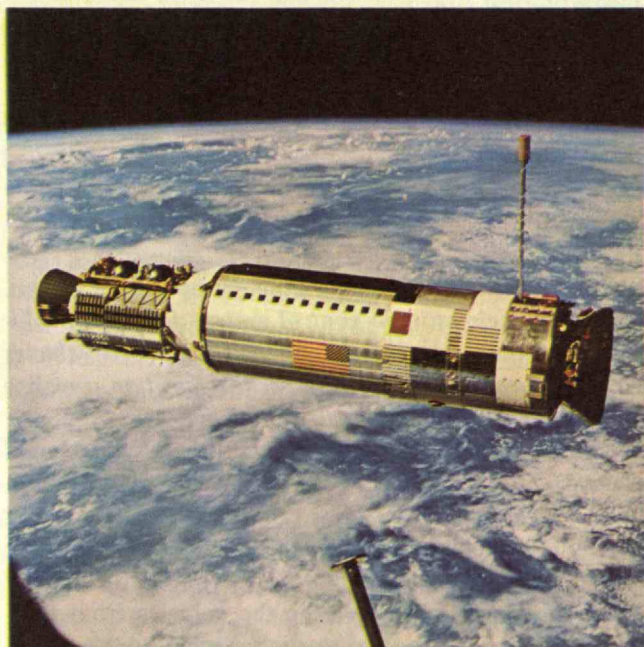
The third lesson that I think we learned is that sincere and intense training and very close attention to equipment familiarization really pays off in this type of effort and there is just no substitute for a very close training.

Colonel Aldrin was questioned after the report on whether he had felt uncomfortable or warm during his work tasks in EVA. He replied:

I believe I commented several times that my feet were getting cool. The temperature inside the suit was very pleasant. It was quite similar to what it had been during the standup EVA. There was no tendency at all for the visor to fog up. I think I had anticipated that the suit mobility might be a little bit more constrictive than it turned out to be. Of course we had gone through these exercises many times in the underwater environment and everything just seemed to be very familiar—as if I had been there before, and had done it before. *Another question concerned his adaptation from daylight to darkness while in EVA. In Aldrin's words:* The lighting that one has in EVA during the daytime is fantastically brilliant, and the pupils just tend to close right down even with the visor lowered. I was not really aware of this until we started going into darkness. I thought that maybe in the next five minutes the stars

On its 44th revolution, the Gemini 12 crew made the photograph opposite of the Texas-Louisiana area, looking east and including San Antonio, Austin, Waco, Dallas-Fort Worth, Houston, Johnson City, and Beaumont.

"That speck on the windshield turned out to be the Agena," said Captain James Lovell, Command Pilot of Gemini 12, at the post-flight press conference. (This photograph of the target was made when the two spacecraft were 50 feet apart.) "I am sort of glad we had a radar failure because it gave us an opportunity to use the backup charts that all the crews had been practicing quite a bit but have not really utilized," he said.



PHOTOS: JAMES LOVELL AND EDWIN E. ALDRIN, '63, FROM NASA

might come out and I might be able to see them, and help Jim move around to this constellation. He was already in the process of moving the combined spacecraft and Agena around, but I could see absolutely nothing in terms of stars. Once the sun went down it took a period of about three or four minutes and it was a situation very similar to one where you would come inside into a dark interior room from a sunlit outside with snow covering the ground.

A later phase of the mission was the tether exercise. This was a so-called gravity gradient operation, whose object was to use the differing gravitational attraction between the Gemini vehicle and the Agena rocket and the earth to stabilize the two vehicles in a vertical position above the earth. The two vehicles were tethered together, and the pilots attempted to maneuver their craft away from the Agena until the tether was taut.

Owing partially to the loss of two thrusters, they experienced a lot of rolling; when they had overcome this problem, they began to fear that the slack tether would become entangled on an antenna on their craft. This did not occur, but as they came up towards nighttime they had still not stabilized the craft; they decided, however, to continue with the operation. Gradually the tether became taut, and they thought that they had achieved their objective, but as the night wore on the Agena slowly moved up to the horizon, and they realized that they were actually in a very slow spin.

Next day they tried again; they got above the Agena, and freed their attitude control system for two revolutions and then released the Agena's. The two vehicles were captured by gravity in a vertical position traveling around the earth. In Colonel Aldrin's words:

When the gravity gradient is established, you should end up with a periodic oscillation back and forth. Initially we were in rather poor position to determine just how much velocity we should put in. The tolerances are on the order of a quarter of a foot per second accuracy at the stationary point to keep the vehicles from tumbling all the way over and starting a spin. As the period or the amplitude of this motion gets larger, the total time period also increases, and this is why it wasn't until near the middle of the night pass that we discovered that we were approaching the position where we would go unstable.

If we had not maneuvered at this point, we would have definitely gone into a very slow spin and gone down below the Agena, so we had to take some action. I might add that, initially, the tether was quite loose and occasionally we would bounce against the end of it. I was very surprised at how quickly—in 10 to 15 minutes—the tether seemed to damp out these oscillations and gradually assume a taut position. We'd been led to believe beforehand that it might take several revolutions before this would happen.

We made one maneuver, which wasn't very clean because we didn't have good attitude control. We had to select which thruster we could fire to get the system moving back in this direction. Then as we came across the top, Jim said "Gee, we look in great shape. Let's

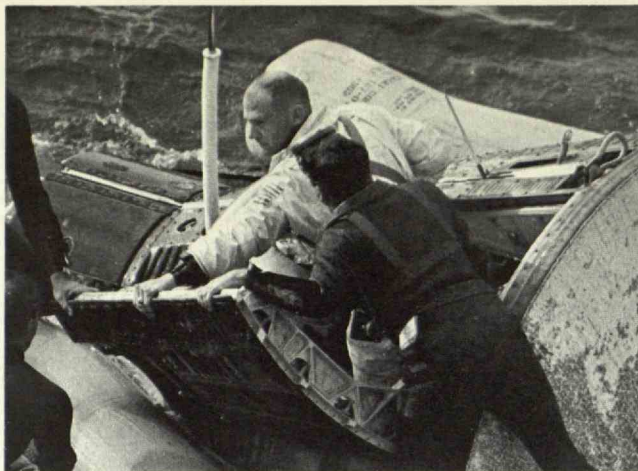


PHOTO: NASA

Gemini 12 pilot Edwin E. Aldrin leaves the spacecraft after landing just two and a half miles from the prime recovery ship *USS Wasp*, ending what Command Pilot James Lovell called "four days' vacation with pay to see the world." The scorched dish-shaped heat shield that protected the astronauts during re-entry is in the foreground.

just leave everything the way it is." But I pointed out that if we didn't make a maneuver right at the top, we'd just find ourselves right back over in this condition at about the end of another orbit. So I talked him into "TWEAK"ing it another couple of times and the next time we reached the maximum amplitude, it was about 40 to 50 degrees from the vertical. We just left it that way completely with the Agena still having its attitude control system.

I might add that the dipole, a long antenna on the vehicle, gave us a very good reference system as to which way we were going in orbit. Our attitude was moving around considerably at this time and just by looking down and judging from where the dipole was, we could get a very good idea and keep track of our position.

We had a total of three orbits doing this, and during the last revolution, we released the Agena's attitude control system. It started a slow roll and some gradual pitch oscillations and it became much more difficult for us to see what our position was. It seemed as though the total amplitude or total swing tended to increase after we had released the Agena attitude system.

The forces that existed in the tether were very very small. This wire that connected it up to the docking bar had a slight bend into it from the initial stowage and it seemed to keep this bend even though the tether was in this taut position. And of course, you could just hold with your fingers and pull it into a straight position. *Afterwards they separated from the Agena, and continued the flight. They were unsuccessful in trying to spot a sodium vapor trail launched by the French, although this was perhaps not surprising, since the cloud was about 250 times dimmer than the surrounding desert. And then on their fourth day in space their water gun failed. They thus had to turn to some of their re-entry water. Finally they splashed down in the Atlantic only two and a half miles from USS Wasp, to complete what Colonel Aldrin's command pilot described as "four days' vacation with pay to see the world."* ■

Wanted: Materials That Do Not Exist

There is an urgent need for materials
that will withstand extremes of corrosion,
heat, cold, radioactive bombardment

By George A. W. Boehm

Virtually every engineering endeavor at the frontiers of technology has a long, help-wanted list that urgently needs filling. The list consists of materials that do not exist. If they were available, engineers would be free to make swifter strides in the space program, aviation, electronics, and consumer products.

Lightweight materials which retain structural strength and toughness well above 1,000 degrees C. could more than double the range of jet aircraft and make vertical take-offs and landings practical for large planes. Promising materials have already been made experimentally—but at twice the price of gold.

Applications of nuclear energy call for materials that do not deteriorate under heavy and prolonged radioactive bombardment. With the atomic age well into its third decade, this problem has barely been scratched.

The difficulty of controlling corrosion is a severe limitation throughout industry. It has been estimated that 25 per cent of the nation's annual steel output goes to replace products that have been ruined by rust.

In the realm of exotic materials are the refractory metals, such as molybdenum and niobium, which retain their strengths at temperatures so high they cannot be measured accurately. But unless protected by an inert atmosphere or coatings, these metals boil away in oxide fumes like dry ice on a summer day, and suitable coatings for them are yet to be invented. Furthermore, many alloys already in common usage corrode and crack under stress for reasons that no one fully understands.

Designers of computers and communications equipment are looking for materials that will store and process information in still smaller spaces and will switch signals in smaller fractions of a millionth of a second. They also want greater flexibility in handling signals electrically, magnetically or optically, and this, too, is basically a materials problem.

Power generation, communications and scientific research have many potential applications for powerful and compact magnets made with superconducting metals. Fairly suitable superconducting wires have recently been manufactured, but there is great room for improvement: superconductors that would withstand much higher magnetic fluxes and materials (probably nonmetals) that would remain superconductive far above the extremely low temperature range to which superconductivity is now confined.

Even fundamental science has its problems with materials. All too often a chemist or physicist investigating some phenomenon finds his measurements blurred by impurities in the material. If he cannot get purer materials than can now be made, he needs at least a reliable assay of impurities so that he can discount their effects.

With so many needs now obvious, the hunt for new materials is under way on an extensive scale and it is enticing some of the best minds in science and engineering.

In a recent informal poll, 50 members of the National Academy of Sciences named materials research and molecular biology as the two fields most worthy of

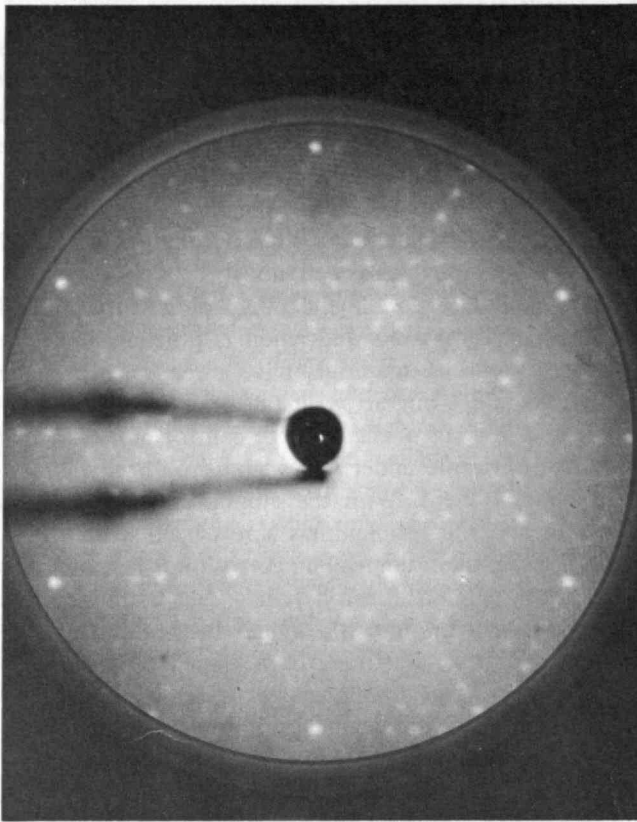


PHOTO: DAVID P. SHOEMAKER

This low-energy electron diffraction pattern showing limited electron penetration of a silicon crystal is related to the structure of the first one or two atomic layers only.

support. They based their judgment on a number of criteria, in addition to the intrinsic intellectual challenge of each given field. How greatly, for example, might it contribute to defense, commercial developments, national prestige and advances in other sciences?

When the replies were tabulated it was found that the most glamorous fields of science—notably space exploration and high energy physics—made strong showings. Nonetheless, sharing top spot (along with molecular biology) was the study of the basic nature of useful materials.

In fact, materials research has become one of the fastest growing areas of science. Two of every three medium and large industrial plants now have their own materials engineering groups or departments (one out of 10 had them a couple of decades ago). More than a dozen leading universities have materials centers, sponsored mainly by the Department of Defense as part of a conspicuously well conceived and ably managed national research program. This field may even be spawning a modest industry of its own. A few months ago Syntex Corporation, a drug manufacturer, and Varian Associates, an electronics firm, established Synvar Associates, a joint enterprise to investigate materials with novel physical and biological applications. Among the new company's targets is an organic compound that does not yet exist: a superconductor that will operate at room temperature.

Swinging Pendulum

This search for useful materials reflects industry's conviction that discoveries will have great commercial value and science's conviction that much other research will be delayed until suitable, new materials are developed. It also reflects the rather widespread conviction that the nation's research programs are in danger of becoming unbalanced. Following the first space flights a good many Government administrators were carried away with the idea of supporting science for science's sake. Today the pendulum is swinging back to research that promises more immediate application. President Johnson has, for instance, cautioned the National Institutes of Health to pay more attention to cures for disease while investigating fundamental biology. Congress is in the process of enlarging the scope of the National Science Foundation to support applied research in addition to pure science.

Modern materials research, with its emphasis on the underlying physical and chemical causes of properties, represents a sharp break in the history of technology. Traditionally, useful materials have been invented and improved by empirical methods, often by accident. Even today most of the techniques for preparing and treating metals, ceramics and other mass-produced materials are based on tricks of the trade originated by artisans, not scientists. Practical metallurgists, for example, have advanced only a few steps technologically beyond the armorers of medieval Damascus, who, it has been said, hardened their marvelous swords by plunging them red-hot through the body of a living

slave. Steel is now quenched more humanely in thermostatically controlled baths of oil, but the rationale is the same: experience has shown that the recipe makes the metal hard and tough.

It was only in recent years that the scientist began overtaking the artisan. The gross properties of most materials—e.g., tensile strength, hardness, electrical conductivity and magnetic susceptibility—can be explained in terms of basic physics and chemistry at the atomic level. “No practical man now understands metals better than the solid-state physicist,” declares Cyril S. Smith, '26, Institute Professor at M.I.T.

The scientific approach, despite limited practical results so far, promises ultimately to revolutionize the discovery of new materials. Instead of being compounded by rule of thumb, they will be designed theoretically from known basic principles. When that level of knowledge is achieved, an engineer with a particular application in mind will be able to specify exactly the properties he wants and get a material that is very nearly perfect for his purpose. His designs will no longer be fettered to the most suitable materials that happen to be available.

Today, materials scientists most closely approach this ideal in the area of solid state electronics. For example, a basic property of every material is its so-called Fermi surface. This is a mathematical concept that describes the motion of electrons within a material and the forces needed to propel them. Physicists have compiled what amounts to a handbook of Fermi surfaces and can predict the Fermi surface of a new metal—even a highly irregular alloy—accurately to within 1 or 2 per cent.

One reason for this understanding is the brief but intense history of materials research in electronics. It started just after the war when Bell Telephone Laboratories became interested in solid state devices. Its directors soon realized that both scientists and engineers were hobbled by lack of knowledge about materials and a major effort was launched in materials research that has served as a model for many industrial and government laboratories. Today, says research director W. O. Baker, this program serves as an invaluable link between pure science and product development.

Remeika's Accident

Yet in even the most scientifically oriented materials laboratory there is no aversion to exploiting the occasional fortuitous accident—if someone on hand recognizes its possible significance. A few years ago J. P. Remeika of Bell Labs, a chemist who specializes in making hard-to-grow crystals, was trying to dissolve iron oxide and gallium oxide in a flux to produce a single crystal. In one crucible he noticed a few translucent crystals. Upon examining them closely, he found that they were strongly magnetic, much more so than the iron oxide. They turned out also to be piezoelectric: that is, flexing them generated a pulse of electric current. What Remeika had discovered is the only material known that is both ferromagnetic and piezoelectric. Because of this peculiar combination of properties, the

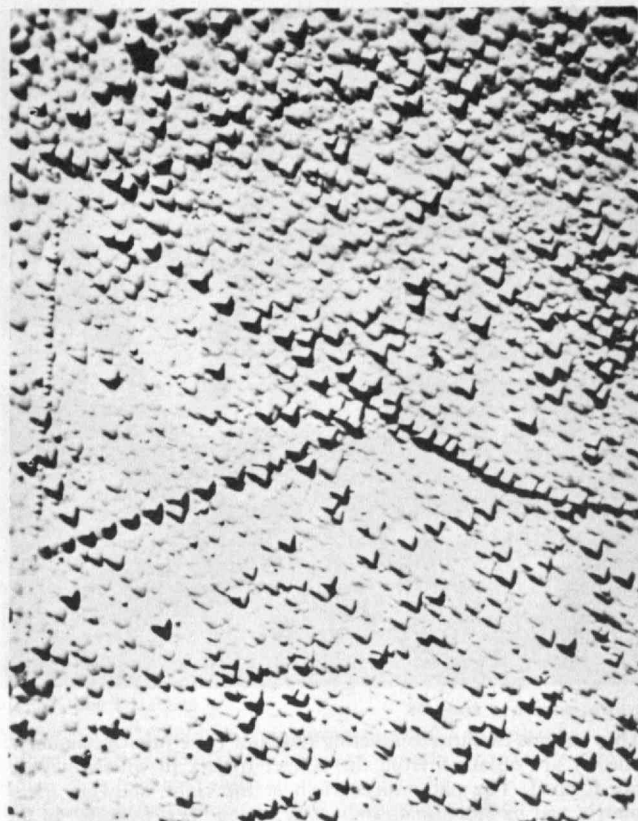


PHOTO: CRAIG S. TEDMON, '61

The triangular pits visible on the surface of this crystal of niobium show the locations of small groups of oxygen atoms within the crystal (1000x). What is the relationship between such features and the crystal's superconducting properties?



PHOTO: ROBERT M. ROSE, '58

Thin strands of superconducting niobium (one micron diameter, above) are obtained from the copper matrix in which they are formed. The photomicrograph at the right, showing the matrix and its niobium strands, was named "best in class" in the 1964 Metallographic Exhibit of the American Society for Metals.

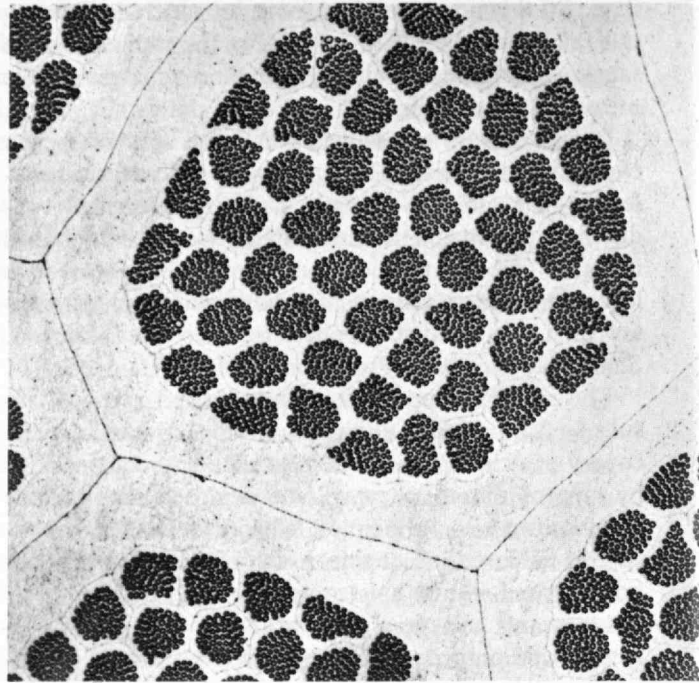


PHOTO: HARVEY E. CLINE, '62

material could be the heart of a gyrator: a sophisticated switching device that, for example, translates magnetic signals into electric signals.

In the next few years theory or accident or a combination of both will probably produce a variety of new materials with odd combinations of properties like Re-meika's strange crystals. A number of laboratories are already working on a class of magnetic crystals called garnets. It is possible to alter the passage of laser light through such magnetized crystals. This might suggest the possibility of eliminating some of the wiring in computers. And the National Bureau of Standards recently announced that ceramic semiconductors made of strontium titanate can be treated to make superconductors. Possible applications include high-speed switches in miniature computers and magnetic shields to protect space travelers from charged particles hurtling through space.

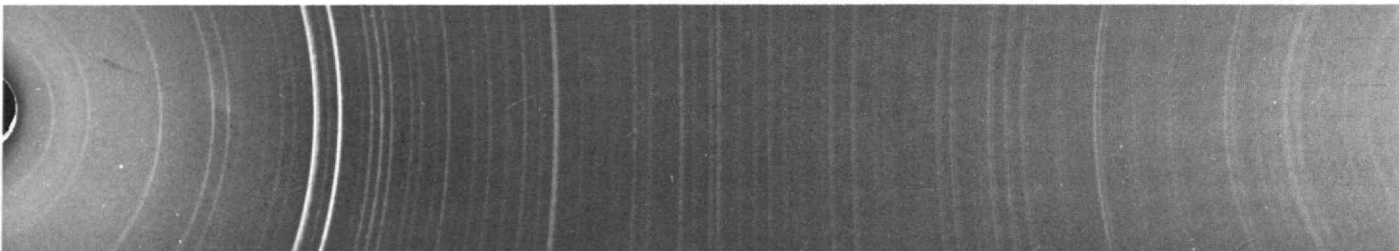
While this extensive research is creating materials

for which there is yet no use, just as we now have uses for which there is no material, there is an ultimate goal. Scientists want "ideal" materials.

Ideal materials would have the internal regularity of a neatly stacked truckload of identical bricks. Small numbers of atoms would be arrayed in simple geometric clusters. These elementary units would be linked to form regular three-dimensional mosaics, called lattices. They, in turn, would form crystal, with its atomic orderliness manifested as sharply defined facets. Given the constituents of a perfectly crystalline material, a physicist can compute its internal geometry and most of its properties. He bases his calculations on the electrical forces that bind atoms and on the familiar thermodynamic principle that matter tends to be in whatever state embodies the least free energy. These "ideal" materials, in themselves, would not necessarily have any practical use. Scientists need them as a base to measure the precise effects of im-

X-ray diffraction of a powdered sample of titanium-nickel-silicon alloy yields this pattern from which the unit cell of crystal structure can be determined.

PHOTO: CLARA B. SHOEMAKER



purities and imperfections introduced in controlled amounts. Given their "ideal" materials, and complete descriptions of the effects of all possible variations, it then becomes easy to formulate materials that are optimal for their intended use.

There is also great interest now in regulating the structure of materials that have basically little internal regularity. Many materials, notably glass and plastics, are like liquids in that they are crystalline only in patches. Much has already been done to modify the properties of some plastics by orienting their long-chain molecules so that they form crystals. Nylon, for example, can be made almost wholly crystalline and thus remarkably strong. And there is some hope that the crystallinity of ceramics can be built up to the point where they become ductile.

Recently, some scientists have become interested in a new kind of material: noncrystalline metal. Some alloys are impossible to make by conventional processes. The constituents can be melted and mixed, but as they cool they segregate into two or more different kinds of crystals. The solution to this problem is to solidify the mixture before it can segregate, and for this purpose a simple new machine called "Splat" has been invented. It blows a cloud of molten metal droplets onto a plate chilled by liquid nitrogen. Cooling at the rate of 100 million degrees per second, the metal solidifies in a flash. The result is a thin film of metal that generally has little or no crystalline order. Nobody can guess whether amorphous alloys will have any strikingly useful properties that would warrant trying to make them in quantity, but Splat does enable metallurgists to study combinations that have never before existed.

Basic materials science may also contribute to what is now the most exciting field of applied materials research: composite materials that are fantastically strong, particularly at high temperatures. Single materials seldom attain more than 1 per cent of the tensile strength that they should have according to physical theory. The reason depends on the nature of the material. In metals, for instance, the main source of weakness is dislocations: places at which the lattice structure to either side is not perfectly matched. The stretching of metal, called plastic flow, is effected largely by the movement of dislocations, which ripple through the material as a wrinkle in a rug moves when nudged by a toe. Dislocations move more easily as the temperature goes up.

In most basically strong nonmetals, dislocations are not much of a problem; either they are relatively scarce or they do not move readily. The trouble with such materials as glass and ceramics is caused by surface cracks, which easily tear into wide rents and thus account for brittleness.

To some extent the strength of metals can be improved by reinforcing them with microscopic ceramic granules, which impede the motion of dislocations the way a chair leg blocks the movement of a wrinkle in a rug. This is standard treatment for silver used in heavy duty electrical contacts. The silver is mixed with a little

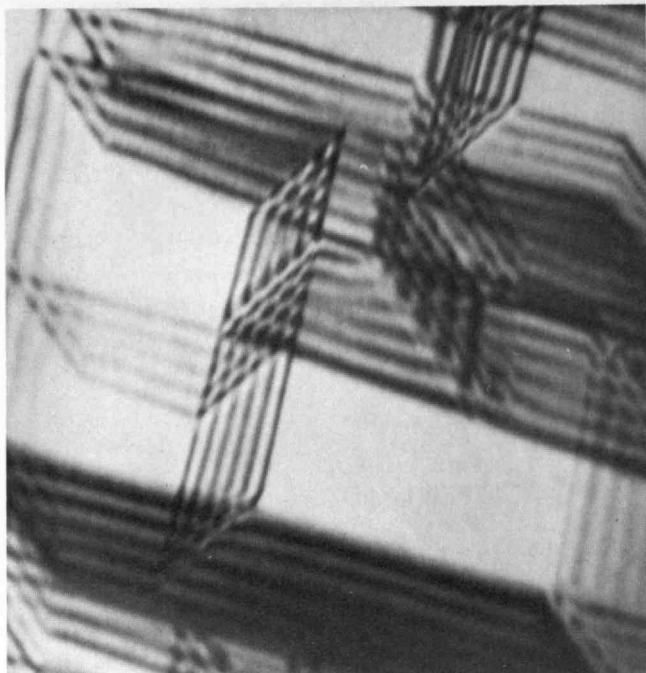


PHOTO: JOHN F. BREEDIS

Micrograph (200,000x) shows stacking faults in an iron-ruthenium alloy. The fringed bands represent planar faults across which have occurred shifts in atomic stacking. The fringes arise through a diffraction contrast effect.

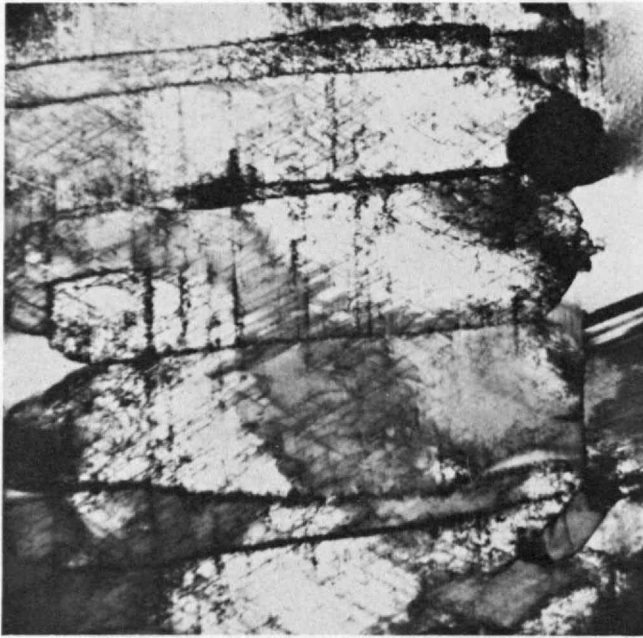


PHOTO: JOHN F. BREEDIS

Strengths of steels may be enhanced by a martensitic or shear-type of phase transformation. As this electron micrograph (100,000x) shows, martensite crystals in stainless steel contain large densities of structural defects—the many dislocations which appear as hairline shadows within the crystals above.

magnesium and then exposed to oxygen at high temperature. The oxygen diffuses into the metal and oxidizes the magnesium. Recently the strength of nickel at elevated temperatures has been greatly improved by the addition of small amounts of thorium oxide.

Superstrength

But the most promising pathway to superstrength materials seems to lie in combining metals and nonmetals in the same manner as plastics are reinforced with fiber glass. The nonmetals are made into slender fibers—preferably each as a single crystal for maximum strength—and these are embedded in a matrix of metal, which protects the surfaces of the fibers from scratches and also absorbs shocks. A variety of combinations have been made and tested. The strongest have contained fibers of synthetic sapphire or boron, but both are at present forbiddingly costly. They, in turn, may be challenged by carbon fibers made by chemically removing hydrogen from long-chain polymers. Devising an assortment of superlative composite materials that can be manufactured at reasonable cost is one of the immediate challenges for materials scientists.

The immediate result, however, is not the principal interest of most scientists in materials research. They do not expect the full impact of their work to be felt for a decade or more and believe, meantime, that we must make up for the many years in which materials research was neglected. As a matter of fact, the need for basic research in this area did not even become obvious until shortly after World War II. Empirical techniques for regulating such phenomena as phase changes in steel had just about been exhausted by then. Moreover, there was a sudden proliferation of high polymers, semiconductors, and other new materials that demanded more exact control. Also, about that time, Bell Labs scientists had invented the transistor and were trying to develop it into a reliable device. Their chief problems were at the materials level, for they soon found that the success of solid-state electronics depended upon reducing critical impurities to the parts-per-billion level and making crystals comparably perfect.

Other scientists, too, realized that many areas of both science and technology were rapidly approaching a dead end for lack of appropriate materials. One of the men who felt strongly about this, the mathematician John von Neumann, was appointed in 1955 to the Atomic Energy Commission, and he urged AEC to give all-out support to materials research. But for several years nothing was done in an organized way; in fact, in the late 1950's, materials research slackened because of budget cuts.

In 1957 a National Academy of Sciences committee conducted a survey for the Air Force and recommended the establishment of a single national materials laboratory. Universities and industry objected that such a laboratory would drain them of specialists.

Shortly thereafter, a panel of the President's Science Advisory Committee worked with the Federal Council for Science and Technology, a group comprising repre-

sentatives of research-oriented Government agencies and some leading non-Government scientists, and an acceptable alternative was created. They proposed that the Government help establish and support materials research centers at universities. At the centers, they reasoned, men of various disciplines could work together, as they are not likely to do across departmental lines of a university. Robert L. Sproull, a Vice-president of Cornell and until recently Director of the Department of Defense's Advanced Research Projects Agency program, explains: "If physicists and chemists are next door to one another in the same building, borrow each other's equipment, and have coffee together, there is a strong presumption that they will be useful to one another in their research."

The task of carrying out this recommendation fell mostly to Defense's ARPA (with smaller efforts by NASA and the AEC). ARPA had the funds, and it also had the latitude to guarantee long-range support for research that promised no immediate results. Forty-five schools applied to ARPA for support for centers. By 1962 funds had been awarded to 12 universities.*

From the research scientist's viewpoint, the centers represent government support at its very best. There is ample reassurance that projects will not be killed abruptly by fluctuations in the budget. Each center gets its appropriation for four years in advance with a new year negotiated as the current year expires. There has been a minimum of red tape, even in supplying expensive research equipment and buildings.

ARPA's manager is Robb Thomson, a metallurgist on leave from Illinois, and as he sees it, his agency's role is to be helpful but not domineering. The university men who head the various centers have great leeway within their budgets to add new research projects and cancel those that are petering out. ARPA does not attempt to finance each center completely. Of the \$45 million going into the ARPA program annually, \$18 million comes from ARPA, another \$18 million from other Government agencies, and \$9 million from the universities themselves.

Unlike most other Government research programs, the materials centers stress the training of young scientists. Currently more than 500 graduate research assistants are at ARPA centers. Dean Harvey Brooks, who heads Harvard's center, is especially enthusiastic about this policy. "I regard our principal product as trained people," he says.

"We know how to support basic research," Thomson says. "We get it done with the proper amount of flexibility. But applied research requires the forging of university-industry links." To this end ARPA is acting as a scientific marriage broker, helping to set up joint programs between schools and industrial laboratories. The Monsanto Chemical Company and Washington University, for example, are working together in St. Louis on

composite materials. Union Carbide Corporation is working with Bell Aerosystems and Case Institute, also in the area of composites. Martin-Marietta Corporation and Denver University have started a combined study on metal-forming with controlled explosions. And, lastly, the Naval Research Laboratory is working with The Boeing Company, Lehigh University and Carnegie Institute of Technology in stress corrosion cracking. Much of the research at the materials centers should have more or less direct applications to products, Thomson estimates, but the line is hard to draw between basic and applied research and it sometimes isn't worth drawing. As Robert A. Smith, a physicist who heads M.I.T.'s Center for Materials Science and Engineering, observes: "The pressure in industry and the defense program often forces you to sweep problems under the rug because you must get a quick answer. If there is something you don't understand, there is usually some empirical way of getting around it. But a thing will very often come back and bite you."

As an example of a problem that was left half-solved, Smith cites some odd striations encountered in large single crystals of silicon, germanium, and other semiconductor materials grown for early transistors. Crystal fabricators used cut-and-try methods to reduce the striations to a point where they no longer spoiled the semiconductors' electronic properties. But the same problem arose in more acute form when they had to grow crystals for lasers. Small striations that could be tolerated in a semiconductor were disastrous in laser crystals. So crystal growers had to start all over again and determine how infinitesimal temperature gradients and almost undetectable mechanical eddies cause impurities to build up, like tree rings. Now that they understand the process in detail, they can design equipment that grows striation-free crystals.

Like the research scientists, the men who have been in charge of the ARPA program recognize that today's practical solution to a materials problem may be impractical for tomorrow. The program, as a result, is a mixture of basic and applied science and the line between them is not overly precise. As Sproull observes: "There are two ways of getting over a mountain, both useful: build a road or invent an airplane." Materials research is doing both and, meantime, as Sproull points out, it is also training a whole new generation of airplane inventors and imaginative road builders. ■



George A. W. Boehm is one of the nation's pioneer science writers. He has held positions with the American Chemical Society, *Newsweek*, *Scientific American* and *Fortune*; and he now is writing on a free-lance basis. This paper, commissioned by IBM's THINK magazine, is reprinted by permission.

*Harvard, Maryland, M.I.T., North Carolina, Northwestern, Purdue, Pennsylvania, Illinois, Brown, Stanford, Cornell, and Chicago. The AEC supports a similar center at the University of California at Berkeley and also contributes to Illinois. And the National Aeronautics and Space Agency has materials centers at Rice Institute and Rensselaer Polytechnic Institute.

Re-entry on the Small Scale

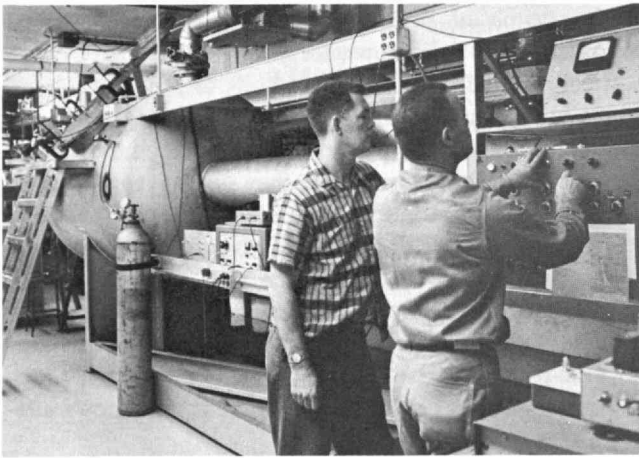
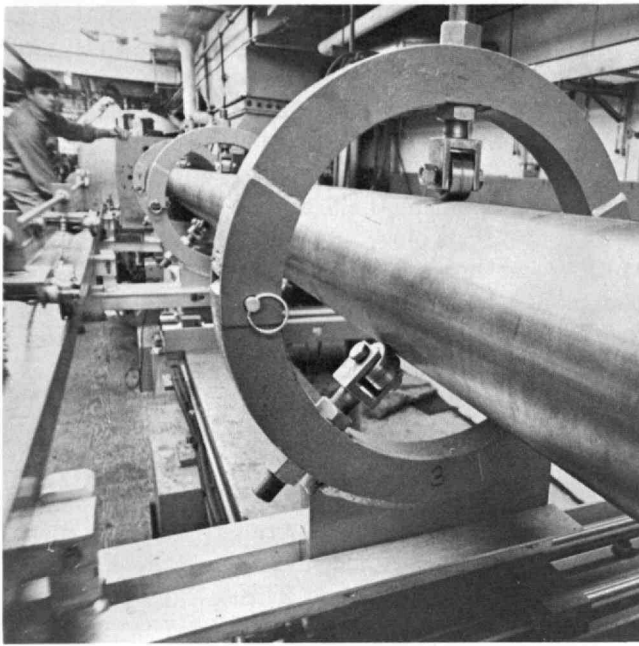
The use of wind tunnels to test on a small scale such subjects as aircraft designs and the effects of wind on buildings has shown the great value of model studies. However, at hypersonic velocities wind tunnels have many limitations, in speed, temperature and even the gas which one may flow inside them. For the case of very high velocities the best method of extending model studies beyond these limits is to turn the problem inside out—instead of sending a stream of gas past a stationary model, one fires a projectile through a stationary mass of gas, in a ballistic range. This technique also permits study of extremely long wakes, impossible in wind tunnels. For the past four and a half years M.I.T.'s Lincoln Laboratory has pioneered work on re-entry effects on the small scale at its Re-entry Simulating Range. This work is supported by the Advanced Research Projects Agency of the Department of Defense.

Apart from their obvious use in modeling real re-entry effects, the Lincoln Laboratory studies form the basis of a relatively new sub-discipline of physics. Observations of just what is happening in the wake of a small projectile traveling at more than 20,000 feet per second are still in their infancy. Already they are showing that the theoretical treatments of such problems have been well wide of the mark of reality.

The subject has broad boundaries, borrowing from thermodynamics and basic chemistry and physics as well as from aerodynamics. And an obvious necessity in dealing with events which are over within millionths of a second is extremely well-designed and well-engineered instrumentation.

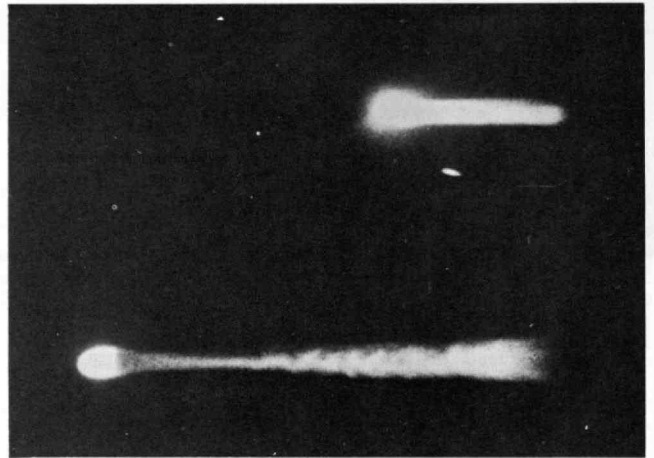
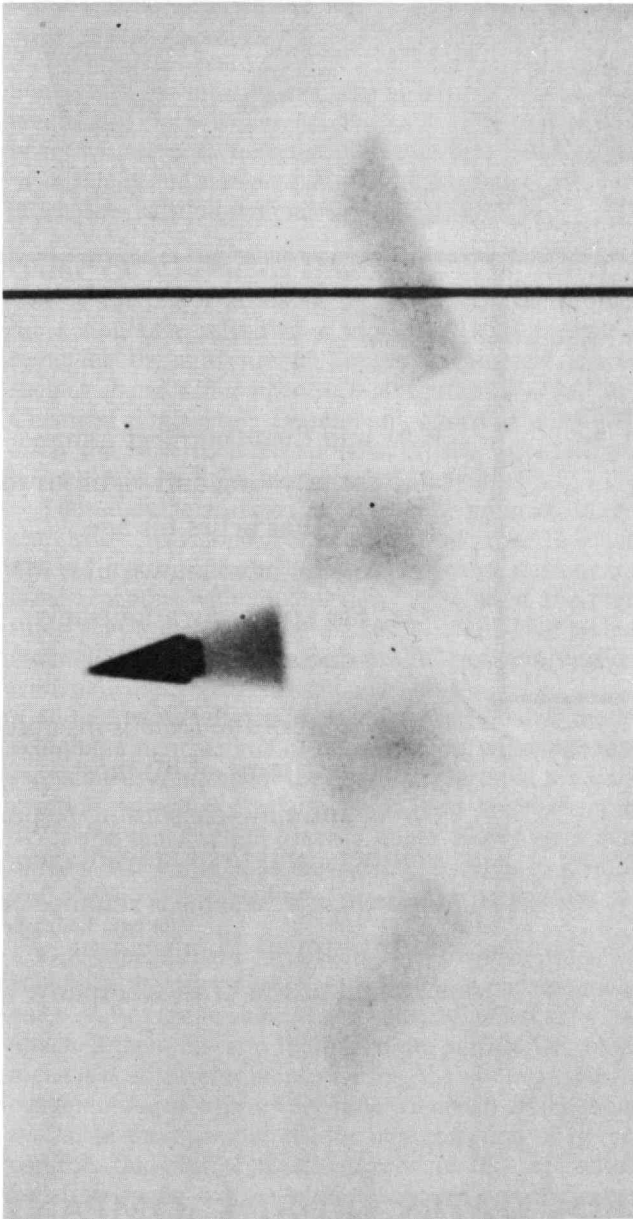
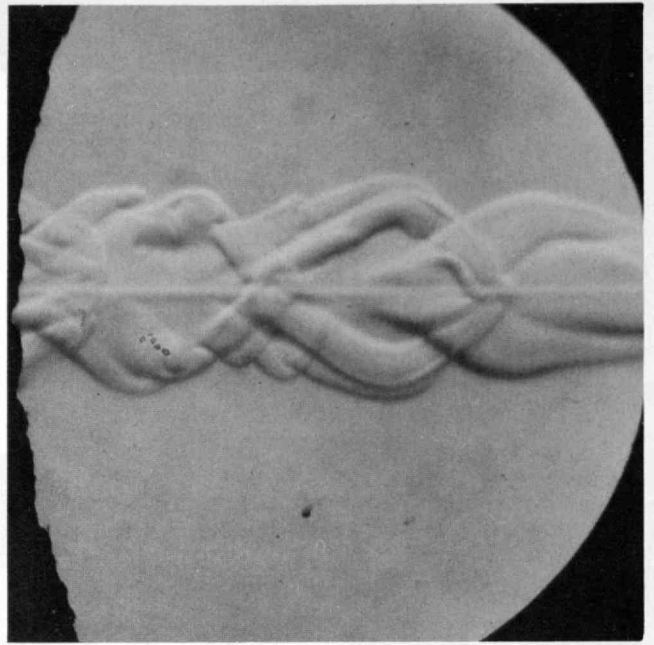
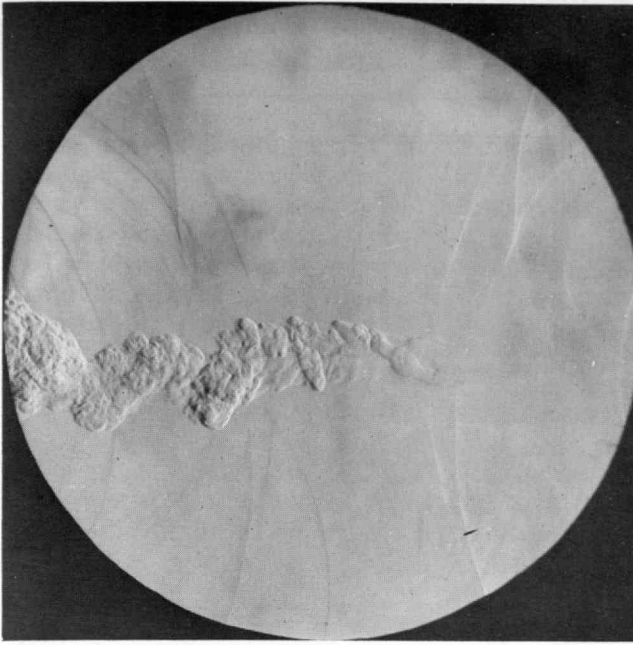
The Lincoln Laboratory's re-entry group has three ranges at its disposal, one of which is used for testing instrumentation. The two measurement ranges use common principles of operation: a projectile, of spherical or conical shape, made of metal or plastic, and encased in a holder (or sabot), is fired from a gas gun, when highly compressed hydrogen expands.

Before the projectile enters the functional part of the tank it separates aerodynamically from the sabot; x-ray photographs are taken at this point to check the separation and the missile's alignment. It then passes into the main measuring tank of the range, through a sophisticated shutter system which prevents any contamination of the gas in the tank. As it passes through the tank the projectile and the wake it creates come under the survey of a number of instruments. Absorption and emission spectrometers measure the transient species in the wake; microwave cavities measure the electronic properties of the wake—the number of electrons in the ionized gas, and the way this varies with the size, shape and speed of the projectile and the distance behind it; electrodes measure fluctuations in the electron density; and laser and spark sources light up the missile and its wake for very brief, high-resolution photographs. Recent work at the Range using schlieren photography has shown how the stream of gas in the wake changes from a smooth flow to a turbulent wake some distance behind spherical projectiles, and measurements of turbulent statistics have been made.



PHOTOS: IVAN MASSAR (BLACK STAR)

Two aspects of the large (110-foot-long) tank at the Lincoln Laboratory's Re-entry Simulating Range. Upper photograph shows the light gas gun which fires miniature missiles through the tank; lower photograph gives a view along the tank looking downrange. Along the Range are a series of instruments designed to follow the progress of the projectiles as they speed through the tank at up to 20,000 feet per second, and to study the wakes they create.



Views from the inside of the tank at the Re-entry Simulating Range. Before a projectile enters the functional part of the tank, x-ray photographs are taken of it: photograph at bottom left shows a cone separating from its sabot. Above is a sphere of aluminum, photographed by its own light as it flies through the tank. Photographs at top show a laminar wake just turning turbulent (left) and a pseudoturbulent wake behind a sphere in argon, an uncommon form of wake.



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The projectile leaves the tank through another valve and finally impacts a plate of steel. The journey from the gas gun to the stopping plate takes a time of no more than six thousandths of a second.

The advantage of the Lincoln ranges that puts them in the forefront of re-entry research is the gas purity that they guarantee, as well as the excellence of their instrumentation. The gas in the larger tank contains no more than two parts of impurity in 10^5 —and the technicians could reduce impurities to one tenth of that value if the experimenters required it. The tanks are often dirtied by the techniques of firing and stopping the projectiles and here the smaller, stainless steel Range comes into its own, for it can be dismantled, cleaned, and reassembled within three days.

Whenever firings are taking place on the ranges the obvious precautions come into force. No smoking is allowed in the building as the hydrogen is fed into the gas gun. Just before the firing the room containing the range is sealed off by closing a door of two-inch armored steel, and all personnel in the building cover their ears while the firing takes place. And, to prove that the group is human, minor mishaps occasionally occur. As a spectacular example, a scar on the wall of the larger tank bears witness to a tungsten projectile that did not take the straight and narrow path. But such events are very much the exception home on the Range. □

Catalytic Effects of Light

One of the major problems faced by scientists probing the action of catalysts at a molecular level is that of removing the influence of large-scale physical effects, such as changes in temperature. Recent work at M.I.T.'s Chemical Engineering Department, aimed at doing precisely this, has disclosed an unexpectedly large effect of near ultraviolet light upon catalytic activity.

The study forms part of a general program of research by Raymond F. Baddour, '49, and Michael Modell, '60, on the possibility of changing rates of catalyzed reactions without changing temperature and pressure. They were analyzing the reaction in which carbon monoxide burns in oxygen to produce carbon dioxide, with palladium metal as a catalyst.

In their work, Professors Baddour and Modell are developing a new method of investigation: taking spectroscopic measurements of the substances present while the reaction is actually taking place, and simultaneously observing the reaction kinetics under steady state conditions. The continuous measurements serve to identify the chemical intermediates which are present on the catalyst surface.

One aspect of the investigation was to determine the effects on the rate of reaction of carbon monoxide molecules and oxygen molecules, separately, when they had attached themselves to the palladium surface. Normally molecules of carbon monoxide hog the surface, and the oxygen molecules have very little chance to attach themselves. In these conditions, the concentration of oxygen controls the rate of reaction, because this determines just how many oxygen molecules can force their way onto the palladium surface through the blanket of car-

bon monoxide. But if the oxygen molecules are given a fair chance to squat on the surface, by 'drowning' the carbon monoxide with excessive amounts of oxygen, the concentration of carbon monoxide begins to control the rate.

Professors Baddour and Modell then looked at the possibility of studying the separate influences in the normal reaction mixture. One way of overcoming the blanketing effect of carbon monoxide is to alter the temperature, but this in itself greatly influences all catalytic events simultaneously. An alternative method is to use the effect of light at constant temperature.

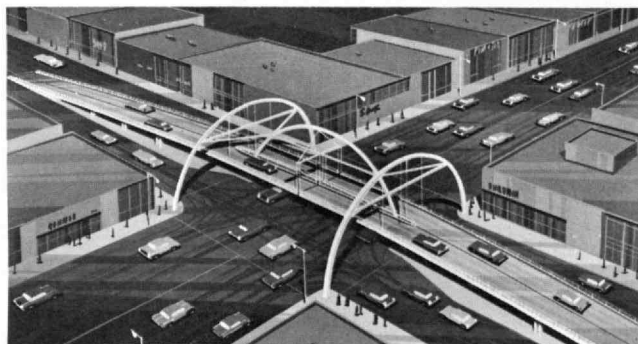
In this work, a quartz tube was used as a reaction vessel, with palladium wire as the catalyst. The source of light was a mercury arc lamp, suitably filtered to restrict the light reaching the reaction mixture to one portion of the spectrum. Professors Baddour and Modell found that the difference between the rates of reaction in darkness and in light, after allowing for the small effect of the light in heating the wire, was very great—as much as 300 per cent. Furthermore, the effect was restricted to a narrow range of frequencies.

The professors believe that the light weakens the bonds between the carbon monoxide molecules and the palladium surface; as a result more molecules of oxygen can find spare places on the surface and speed up the reaction. However, further investigations are called for; the results with palladium wire were clear-cut, but the method does not lend itself to very accurate measurements.

Now an entirely new technique is in prospect. This will measure accurately the effect of light upon the mixture adsorbed on the metal surface by reflection spectroscopy: infrared spectra at the scene of the action will be observed by taking reflection spectra of the catalyst surface (with the molecules of reacting gases and intermediates attached to it). The undertaking calls for development work to provide suitable instrumentation, but in these researchers' opinion the proposed experiments present no insurmountable difficulties.

Meanwhile, attention focuses on possible applications of the discovery that light has such a large influence. Professors Baddour and Modell believe that the effect may be produced in all reactions catalyzed by metal surfaces

Quick answer to hard problems? This prefabricated bridge has been proposed by William W. Pleasants, '33, Caribbean-area manager of Tippetts-Abbett-McCarthy-Stratton, to simplify traffic problems at busy urban intersections. The suspended structure could be built at a distant point and assembled at most city intersections with minimal disruption of traffic and service. Mr. Pleasants says a reduction of 80 per cent in traffic involved in "conflict points" may be possible at some locations.



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The Trend of Affairs

(provided the intensity of light is high), different reactions requiring different frequencies of light for enhancement. Thus, the work may eventually produce a new breed of selective catalysts, in the form of lasers producing light at a variety of different frequencies, which can be switched on to enhance any catalyzed reaction the operator chooses. □

Personnel Statistics

Colleges and universities are the nation's largest users of scientific talent, according to the National Science Foundation.

Thirty-six per cent of the 243,000 U.S. scientists who reported in to NSF's 1966 inquiry for the National Register of Scientific and Technical Personnel are employed at educational institutions; 34 per cent reported from business and industry; and 10 per cent from government.

Economists, statisticians, and physicists reported the highest median salaries—\$13,100, \$12,800, and \$12,500, respectively.

The median salary for all scientists responding was \$12,000, an increase of \$1,000 over the 1964 figure. The highest median salaries were reported by self-employed scientists; those in business, industry, and non-profit organizations were next, followed by those in the federal government and in educational institutions.

Eight per cent of those in the National Register are women.

The youngest scientists (median age 34) were in physics and mathematics; the oldest (median age 43) were in sociology and anthropology.

Meanwhile, roughly comparable figures on salaries of engineering technicians, developed from a 1965 survey by the Engineering Manpower Commission of Engineers Joint Council, show that technicians with 10 to 15 years' experience earn median annual salaries between \$7,500 and \$8,000. Technical institute graduates' salaries are about \$1,000 per year higher than nongraduates' in the first 14 years of employment, then rise gradually to a maximum differential of over \$8,000 per year. □

New England Radio Observatory?

A fully steerable radio telescope with a dish of 300- to 500-foot diameter is now economically feasible, even in the tough New England climate. This, according to *Science News* (December 31) is one of the early conclu-

sions of the committee looking into the problems of setting up an advanced radio and radar astronomy research observatory in New England.

The Cambridge Radio Observatory Committee (CAMROC) was set up to develop a plan for a new regional research facility in June, 1965, shortly after publication of a National Academy of Sciences report calling for a plan for several large U.S. radio telescopes to go into operation in the early 1970's. Its 11 members come from Harvard University and the Smithsonian Astrophysical Observatory, and M.I.T. and its Lincoln Laboratory. Resources to support these studies come from the National Science Foundation and the U.S. Air Force and from the institutions themselves.

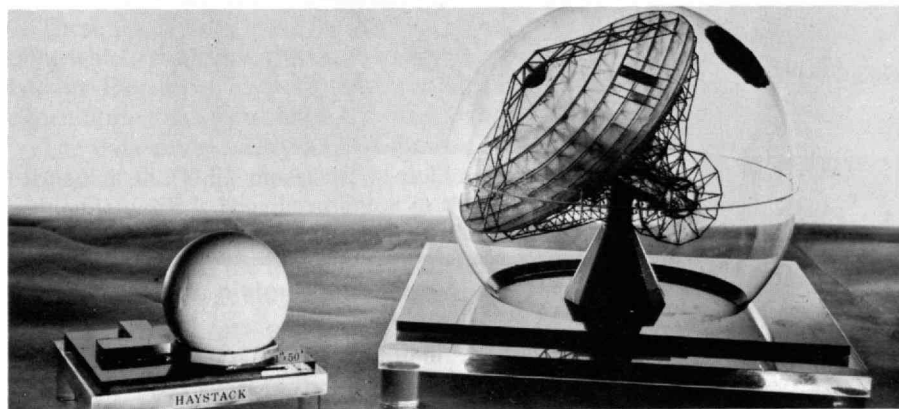
The final report of CAMROC is not due until July of this year, but a few hints of the committee's progress have already appeared. Herbert G. Weiss, '40, Associate Division Head of Lincoln Laboratory, gave a progress report at the NEREM meeting in Boston last November. He indicated that the committee was tentatively thinking in terms of a 400-foot telescope antenna protected from the vagaries of the atmosphere by a radome, similar to but presumably much larger than the one encapsulating the Lincoln Laboratory's Haystack facility. This consists of a plastic covering on a framework of metal.

No existing steerable radio telescope dish exceeds 250 feet in diameter, owing to the engineering problems and high costs involved in incorporating in such an instrument the necessary precision and adaptability to changes in the weather. Mr. Weiss pointed out that winds as low as 20 to 25 miles per hour and heating by the sun adversely affect the performance even of many existing dishes.

The use of a radome would overcome this problem, and of course would substantially reduce the cost of the installation. The over-all weight of an antenna enclosed in a radome would be only about 20 per cent of that needed for an exposed antenna with equivalent performance, while the absence of wind forces can reduce the power required to steer the antenna by as much as 90 to 95 per cent. And contemporary designs of radome would only contribute a very small amount of noise to the general background that the receiver detects.

However, a radome of this size—a 400-foot diameter dish would require a radome with a diameter of 500 feet—presents many engineering problems of its own, and the committee is evaluating different forms of design. But the relative costs of the antenna with and without a radome make an impressive argument in its favor.

One possible design for a giant steerable radio telescope now being considered by CAMROC, for a suitable site in New England. The 450-foot diameter antenna would be surrounded by a 500-foot radome, to protect it from the extremes of the climate. The model of Lincoln Laboratory's Haystack facility, whose radome has a diameter of 150 feet, is shown for comparison.



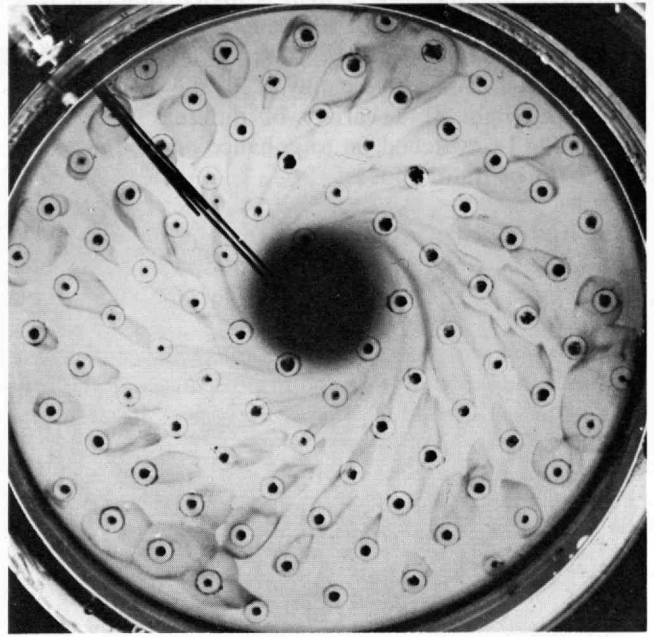
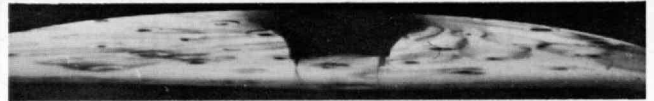
The Trend of Affairs

According to Mr. Weiss, a 400-foot enclosed antenna would cost less than an exposed 250-foot-diameter antenna, even when the costs of the radome are included. □

Oceanographic Site in Massachusetts?

Eastern Massachusetts played host in December to the site selection team from the Environmental Science Services Administration, seeking an East Coast site for a new federal Institute of Oceanography. The E.S.S.A. team is touring East Coast states searching for a base which can offer a deepwater port, docking and warehousing facilities for three oceanographic ships, proximity to one or more major universities with strong departments in earth and physical sciences, and a "good intellectual environment." In addition, the team hopes to acquire the site for free, as a donation by the grateful government of the state selected to house the base.

Governor John A. Volpe gave four main reasons for his opinion that Massachusetts had a strong case for selection: the range of oceanographic research currently conducted in the state is unequaled in the world; the area possesses a large industrial complex to back up oceanography; the state has many suitable sites available; and Massachusetts, in which many thousands of scientists already live, provides the sort of environment that E.S.S.A. scientists would appreciate.



Top and side views of a hurricane, simulated in the laboratory by Ronald K. Hadlock of Florida State University. Energy produced when acid and alkaline solutions mix in rotating chamber corresponds to that released in hurricanes when water vapor condenses.

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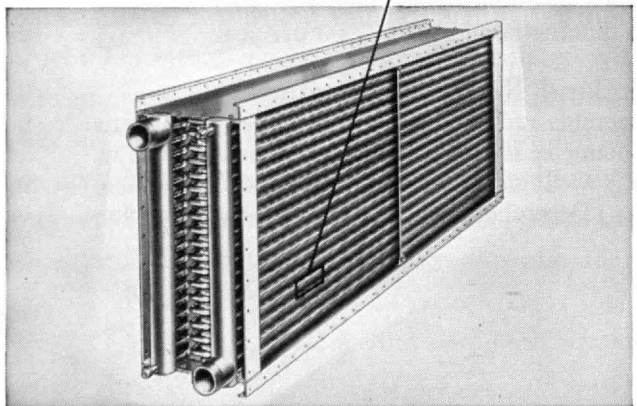
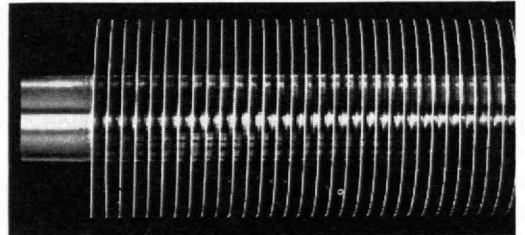
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James R. Killian, Jr., '26, Chairman of the Corporation, was appointed to represent the interests of the academic community to the Site Evaluation Committee. He pointed out three particularly significant developments to illustrate the general interest of the area in oceanography: the formation last April of the Massachusetts Association of the Marine Sciences, by 11 local research institutions; the growth of science-based industries relevant to oceanography in the area; and the co-operative programs recently established between M.I.T. and Harvard and the Woods Hole Oceanographic Institution.

Dr. Killian then referred specifically to M.I.T. where 10 members of the Faculty are working on oceanography and there are large programs in the geosciences, meteorology, marine biology, physics, chemistry, astronomy and astrophysics, mathematics and food science as a general scientific background. Further, developments at the Lincoln Laboratory and the Instrumentation Laboratory in data processing and instrumentation should prove extremely valuable to oceanographic research. And the Department of Naval Architecture and Marine Engineering is now expanding its scope to cover ocean engineering.

However, the intellectual climate is just as important. Dr. Killian commented: "Besides the universities there is another attractive force which draws both creative men and women and research enterprises. This is the existence of a technical community of critical size, one that has become large enough and varied enough to act as a magnet for others of high professional talent and interacting within itself in a way highly stimulating to its members."

According to *Route 128 World*, one of the inspectors commented that the area has a lot to offer. The decision on the site is expected in the spring. □

Research—Growing Campus Enterprise

Research in colleges and universities has increased steadily in the decade from 1954 to 1964, and the total of the increase is nearly fourfold.

By 1964 the total spent by colleges and universities for separately budgeted research and development was \$1.89 billion, of which the federal government paid for more than \$1.5 billion.

And federal financing is an increasing factor in college and university research—from 55 per cent of the total in 1954 to 72 per cent in 1964.

The \$1.89 billion includes \$1.3 billion spent directly in colleges and universities proper and \$590 million spent in university-managed federal contract research centers.

These figures are from the National Science Foundation, which published a special science resources report late in December showing research and development expenditures and personnel in colleges and universities.

The data cover nearly half of the basic research performed in the U.S., measured in dollar terms, because academic work is heavily oriented in this direction (see *Technology Review*, January, 1967). Development was only 3 per cent of the dollar total of research in universities in 1964; it was 40 per cent of the total in university-managed federal research centers.

Of the \$1.3 billion in colleges and universities in 1964, 53 per cent was spent in the life sciences, 24 per cent in the physical sciences, 13 per cent in engineering, 6 per



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The Trend of Affairs

cent in the social sciences, 3 per cent in psychology.

By January, 1965, 250,000 scientists and engineers were involved in university research and development; of these 60 per cent were employed full time and 24 per cent were graduate students working part time. In full-time equivalent terms, universities and colleges proper employed 192,600 scientists and engineers in January, 1965—61 per cent in teaching, 29 per cent in research and development. □

Pollution: Control What Menace?

Air pollution is in every headline and on nearly every conference table, and it soon will be a subject of wide contention in everyday life

A highly publicized national conference in Washington in December emphasized the problem, and some observers were sure its purpose was to lay the groundwork for increasing Federal intervention. Indeed, the Massachusetts Commissioner of Public Health, Dr. Alfred L. Frechette, told the conference that "it is completely unreasonable for the states to make . . . decisions on air quality standards since the states do not have the resources, medical staffs, or time to draw up meaningful standards." The trouble now, he said, is that despite many public pronouncements about the dangers to health, "little has been established" as to acceptable or dangerous levels.

But, he said, once the guidelines are established at the Federal level, the states should have the dominant role in air pollution control—with Federal assistance and money. Others concluded that only Federal control could succeed: if one city presses too hard on the problem, an offending industry may be tempted simply to move elsewhere. "This is one public problem that simply cannot be left to local government to handle as it sees fit," said Senator Gaylord Nelson of Wisconsin.

Other speakers at the conference said:

- More than half of our present air pollution would "be automatically eliminated" by substituting battery-operated for gasoline-burning cars, according to Alex Radin, general manager of the American Public Power Association.
- The fume-control equipment which must be installed on every U.S. car beginning with next year's models will cost about \$50. But it is only a small sample of what is to come, according to S. Smith Griswold, air pollution abatement chief of the U.S. Public Health Service. Initial limits on unburned hydrocarbons and carbon monoxide will soon be tightened, and controls will be started on other fumes such as oxides of nitrogen. Though pollution from each vehicle is reduced, the number of vehicles will probably increase enough so that the control devices which will be in use will only keep the total pollutants to about today's level in the predictable future.
- A number of industrial representatives expressed what the *New York Times* called "very co-operative" attitudes toward air clean-up activities. "This was in marked contrast to many previous suggestions from some industrial quarters that smog was an unavoidable concomitant of production, and that insuperable techni-

cal or economic obstacles prevented remedying it," said the *Times'* man Gladwin Hill from Washington.

• Closing the conference, Dr. William H. Stewart, surgeon general, said it "added up to a single clear call for action now to control air pollution. People are angry about the condition of the air they are breathing." □

Fluidics for the Future

During the last five years the technology of fluid control has been carving out its niche in the industrial scene. Although fluidic devices cannot generally compete with their electronic relatives, they do find a place in a number of areas closed to electronics. Indeed, fluidics has become so well established that it recently warranted a full page report in *Time* magazine.

In a paper presented at a recent Instrument Society of America conference, Richard A. O'Brien, manager of Corning's Fluidic Products Department, foresaw future changes in the field of fluidics: "Perhaps fluidics will become pneumatics, with hydraulics having a substantially different fluid capacity, as is presently the case; or perhaps fluidics will remain fluidics and become a comprehensive, co-ordinate field which will include pneumatics, hydraulics, and other disciplines. The direction fluidics takes will affect the general specifications made by the military and the principal engineering societies. This, in turn, will affect industry."

For fluidics in its present state—the science of pneumatic control with no moving parts—the major problem is that of qualified personnel. Mr. O'Brien estimated that the United States now has no more than 45 skilled fluidic designers. However, their skill is available in concrete form in standard items of fluidic hardware, and the high quality of their talent should aid the rapid development of fluidics.

On the applications front, the scene gives more cause for concern: "We estimate there are 175 engineers in the country who possess good fluidic applications skill. For fluidics to become a major technological field, the number of informed engineers must increase to 1,750 within two years." Commenting on the paper, Forbes T. Brown, '56, Associate Professor of Mechanical Engineering at M.I.T., and a pioneer in fluidics research, felt that the suggested tenfold increase might be somewhat exaggerated. However, in his opinion there is an immediate need for at least three times the number of presently available applications engineers. □

Where Winter Is Summer

Some 150 American scientists are now in the Antarctic for the continent's brief summer season. They are supported by National Science Foundation grants and contracts totaling about \$7.6 million.

NSF funds and manages the U.S. scientific program in Antarctica, making grants to selected institutions and government agencies for research support. The continent is reserved for peaceful purposes, and freedom of scientific investigation is guaranteed under the terms of the Antarctic Treaty signed in 1959 by 12 nations including the U.S., the Soviet Union, and the United Kingdom.

This year's most ambitious U.S. project is a 1,500-mile geological survey traverse of the Marie Byrd Land coast, during which scientists will study the geology and geophysics of the area, make magnetic measure-

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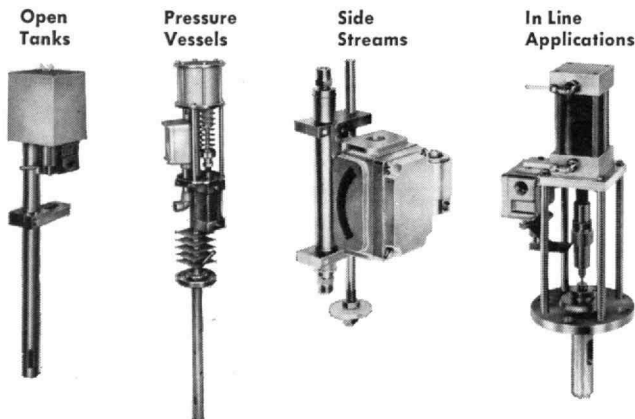
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The Trend of Affairs

ments, and conduct botanical and topographic surveys. A Russian exchange scientist will be a member of the party. Other summer season 1966-1967 activities include deep core drilling aimed at studying the 30,000-year accumulation of ice and the rocks underlying the thick icecap at Byrd Station; studies of fungi, algae, and lichens in the Antarctic "dry valleys," studies of the earth's gravity and the orientation and power of its magnetic field; meteorological studies; and research on insect, fish, and penguin life.

Wintering parties at five Antarctic stations will be relieved and new parties established during the summer. At the newest of these Plateau Stations, elevation 11,890 feet—four scientists and four Navy personnel spent 10 months of the 1965-1966 winter in isolation taking observations in meteorology, aurora, and upper atmosphere physics projects. They recorded a record low temperature (for American stations) of -121.4 degrees F. in August. □

An Airport or a Bridge?

Methods of structural analysis unique in airport construction have been used by the Port of New York Authority to extend two runways at LaGuardia Airport, making them usable for medium-range jet aircraft.

LaGuardia is built on reclaimed land, and foundation conditions are far from ideal. The new construction, extending each of two runways from 5,000 and 6,000 to 7,000 feet, with associated taxiways and holding aprons, would have required 15 million cubic yards of fill. The problems were special, however, because the new runways occupy a former deepwater ship channel. The obvious solution was to dredge a new channel, and this was done. But then model tests demonstrated that "significant and unacceptable changes in tidal heights, current velocities, and dispersal of pollutants" would result from closing the old channel. So the project engineers determined on a radical solution: use pile-supported structures, essentially bridges over the tidal flow.

Five members of the Engineering Department of the Port of New York Authority, including Arne Lier, '23, have reported on their unique analysis of the problem to the New York Academy of Sciences; Arthur T. Ippen, Ford Professor of Engineering at M.I.T., was among the designers' consultants on the project.

"A large-scale installation of structurally supported runways and taxiways had never before been attempted," the designers say. But factors uncommon to conventional waterfront and bridge structures—including especially the highly concentrated loads and the high ratio of live to dead load—suggested to them that this solution might be feasible.

Design criteria were established on the basis of three kinds of loading: ground-handling loads, including taxiing, turning, and braking; normal landing loads; and crash-landing loads. All of these criteria required detailed studies of aircraft vibration, lifting, and vertical acceleration and of the structure's dynamic response.

In their studies of ground-handling loads, the engineers found that the maximum impact force occurs at normal taxiing speeds of 50 to 60 knots and is equivalent

to 37 per cent of the static wheel load. Using the maximum take-off weight of the Convair 880 aircraft, the heaviest operating at the airport, the design load for taxiing was computed as 127,000 pounds per main landing gear.

Similar analyses were required to determine landing and crash loads, since aircraft manufacturers' figures had to be modified to include the response of the structure. In the end, the normal landing load was computed as 180,000 pounds per main landing gear and the maximum "crash" load—derived from the manufacturer's stated load that would cause failure of the landing gear—was set at 278,000 pounds.

To apply these design loads, the new runway structure was divided into three traffic areas. Statistical studies showed that landing impacts were highly concentrated in the middle 60 feet of the 150-foot-wide runways. So this central portion of each runway was designated the concentrated traffic area, and it was designed to support normal landing and taxiing loads at normal design stresses. The remaining runways, taxiways, and holding aprons were designed to carry normal taxiing loads at normal design stresses. And all areas of the structure were required to support crash-landing loads at stress levels approaching the yield strength of the materials used.

"As the concentrated, normal, and infrequent traffic areas are respectively 10, 30, and 60 per cent of the total structure," the engineers point out in their report, "the variation of load and stress made it possible to develop an economical design while maintaining a uniform factor of safety." □

Have Degree—Will Travel

The whims of government contracting and the public's taste are furthering the evolution of a new race of mobile technologists—the contract engineers. Wandering from one job to another according to industrial needs, these space age nomads gain both wide engineering experience and salaries up to 30 per cent higher than their bench-bound contemporaries.

Ernest J. Milani, President of Lehigh Design Company, one of the country's largest contract engineering firms, recently explained the underlying philosophy of contract engineering: "An aircraft manufacturer wins a new contract. A manufacturer of photographic equipment markets a new product which gains widespread consumer acceptance. Both need engineering personnel quickly but the question is for how long? Government contracts can be, and often are, canceled. The public's loyalty to a photographic innovation is easily transferable to another company's brain child. Then what is to be done with the added technical personnel whose recruitment, fringe benefits, and overhead represent a heady investment for the company?" Many industrial concerns solve this problem by turning to contract engineering firms when a sudden need arises for temporary manpower.

The contract engineers themselves see their work as an opportunity to play the field profitably before they settle into permanent jobs. Their projects may last from a week to several years; whenever they change jobs, the new employers pay relocation expenses, and the engineers have the obvious advantage of living in whatever different places and climates appeal to them most. As

soon as one project is completed, their company lines up another.

According to Mr. Milani, contract engineering is rapidly making its mark with the giants of industry. And in addition to General Motors, Westinghouse, IBM and NASA, M.I.T. numbers itself among the clients of Lehigh. For the last two and a half years Lehigh engineers have been working in the Instrumentation Laboratory on the Apollo contract. □

Nongovernmental Organizations

Mounting financial problems of private nonprofit organizations, on whom the nation is increasingly dependent for carrying out important public business, are cause for "deep concern," according to Alan Pifer, Acting President of Carnegie Corporation of New York.

By "nongovernmental organizations," Mr. Pifer means scholarly, professional, and cultural associations; health, welfare, and community action agencies; non-university research institutes; agencies providing overseas technical assistance; defense advisory organizations; and independent agencies with educational purposes. Thus, he is not considering schools and universities, hospitals, fully endowed foundations, and many other tax-exempt institutions.

The rapidly growing use of these nongovernmental organizations by the Federal government, he says, is creating problems that are little understood, and a comprehensive and careful study of the situation is needed.

The Federal government is calling upon nongovernmental organizations for an ever wider variety of domestic and international services for two reasons: be-

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cause of the "growing complexity of the domestic and international problems with which it must cope"; and because nongovernmental organizations can provide certain capabilities that an alert Federal administration needs but often cannot muster—the abilities to move swiftly, flexibly, and imaginatively, to make objective appraisals of programs free of political influence, to engage in some kinds of experimental activities.

But project support alone—which is the only support now offered by the Federal government to the nongovernmental organizations—encourages increasing dependence on government funds and may well in time make these organizations "little more than appendages of government," thus destroying their usefulness as independent agencies, says Mr. Pifer. He finds that with its present policy of paying only for the tangible product it contracts for and receives, the government does not assume any responsibility for the basic health of organizations whose help it badly needs. The partnership between nongovernmental organizations and government resembles the longer established one between government and the universities: "Just as we now have the 'federal grant university,' so also we have the 'federal grant nongovernmental organization,'" Mr. Pifer writes.

The government has by now recognized the need to keep the universities healthy by ensuring their long-term strength through grants for a variety of purposes unrelated to specific projects, but it has not accepted similar responsibility for the more diverse and less easily defined nongovernmental organizations.

The important issue, Mr. Pifer says, is beginning to emerge clearly: "Is the nongovernmental organization of the future to be simply an auxiliary to the state, a kind of willing but not very resourceful handmaiden? Or is it to be a strong, independent adjunct that provides government with a type of capability it cannot provide itself?"

"If we want to avoid an ever more extensive and powerful Federal government, it would seem that we must now, paradoxically, use Federal money to ensure that we have a viable alternative—a network of vigorous, well-financed nongovernmental organizations ready to serve government but able, in the public interest, to maintain their independence of it. This further financial burden on government may be unpalatable to many. But the logic of it is hard to escape." ■

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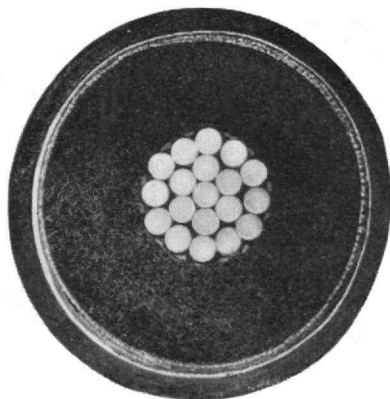
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Malnutrition, Learning and Behavior

Scientists from 17 nations will attend a conference at M.I.T. from March 1 through 3 to examine growing evidence that malnutrition in early childhood impairs human learning ability and behavior patterns. The 600 visitors will include clinical and research physicians, nutrition scientists, psychologists, educators, and behavioral scientists.

Explaining the purpose of the conference, Nevin S. Scrimshaw, Head of the Department of Nutrition and Food Science and Chairman of the Conference, describes it as an attempt "to examine the slowly growing body of evidence suggesting a significant relationship between early malnutrition in human populations and subsequent alterations in performance on various tests of learning and behavior. It is recognized that the evidence from experimental animals is much better and easier to interpret than the fragmentary and frequently confusing observations on human populations. Nevertheless, the subject is of such importance to both the developing countries and to the nature of national and international efforts to assist their economic and social development that an international conference of this sort can be of very great value."

Education in Revolution

The nation's expectations of its colleges and universities have never before been so great, Howard W. Johnson, President of M.I.T., told over 600 alumni and their guests at a dinner of the M.I.T. Club of Southern California in Los Angeles on January 17.

The universities' response, he said, must be to broaden and deepen their contributions through teaching, through helping to solve urgent technological and social problems, and through increasingly effective collaboration with industry.

"Liberal" education today, he warned, may fall short of its objectives if it does not include an understanding of the forces of scientific discovery. "I believe that effective training of men and women to understand and to master today's problems," said President Johnson, "requires a basic comprehension of science and technology. Without this comprehension, they run the risk of serving the technology which was meant to serve their human needs."

Education should take place as an

exchange between teacher and student on three levels, he said—technical competence, decision-making ("the training of the mind to analyze and ask the right questions, to choose, to judge and discriminate, to consider the human values, to order chaotic situations and to deal with ambiguity"), and personal responsibility—an understanding of the obligations of a professional person to make positive contributions in the field of his choosing.

Nor is the universities' role confined to education in the "college" years, said President Johnson. Especially in the modern era of rapid changes, we must provide men and women—and particularly our leadership groups—with "an opportunity to reassess the assumptions which govern our behavior patterns, our individual actions, and the actions of the world around us."

These questions of maintaining continuing effectiveness and understanding are now becoming so critical, he declared, that some industrial organizations may soon develop their programs around a sabbatical year concept. The university campus, President Johnson said, is "the logical home for a lively dialogue that takes place when individuals and organizations come together in the task of updating knowledge, sharpening introspection and self-renewal."

Ralph G. Hudson, 1885-1967

Ralph G. Hudson, '07, Professor Emeritus of Electrical Engineering who was known to many thousands of M.I.T. alumni who studied in the Institute's largest department, died in Fort Myers, Florida, on January 1 after a long illness. Professor Hudson was a member of the Department of Electrical Engineering for 47 years before his retirement in 1955.

Born in Lawrence, Mass., in 1885, Professor Hudson joined the M.I.T. Faculty as an Assistant Instructor in Electrical Engineering. In 1909 he was appointed Instructor and in 1916 Assistant Professor. He became an Associate Professor in 1922 and full Professor in 1929. For many years Professor Hudson planned M.I.T.'s commencement programs as chairman of Commencement Committee.

Professor Hudson was author and co-author of a number of widely used textbooks and handbooks in the field of electrical engineering, among them: *Engineering Electricity*, *Electronics*, *A Table of Integrals*, *A Manual of Mathematics*, *American Handbook for Electrical Engineers*, and *The Engineer's Manual*; and he wrote numerous articles for magazines, journals and encyclopedias. He was a fellow of the

American Association for the Advancement of Science and a member of the American Institute of Electrical Engineering and of the American Association of University Professors.

Professor Hudson leaves three sons, Gerald C., '34, and Julian L., both of Fort Myers, Fla., and Perry M. of Weston, Mass.; and a daughter, Priscilla Hudson, of Munson, Mass.

"Interface"

The "Interface," described as "an informal meeting place for the M.I.T. community," is now being completed in the basement of the religious counselors' building at 312 Memorial Drive.

Its goal, according to its builders, is to provide a place for students to meet other students of different religious backgrounds, "thus broadening each others' view of life," and to provide a place for informal meetings between faculty and students. The committee headed by Charles G. Bures, '69, and including representatives from all the student religious groups is doing the painting and redecorating chores and planned to be open for business by the beginning of the second term.

Reverend Donald H. Lee, religious counselor who is working with the students on the project, sees it as a way to help broaden the experience of some undergraduates who, he says, seem to retreat from classes directly to their dormitories. "People need people at levels that are non-pressure and informal," Reverend Lee says. "Some students feel on the outside; they don't feel part of the academic world here," and he hopes that Interface will be a step to helping them.

Pass-Fail Tested

"Pass-fail" grading will be in effect on an experimental basis this spring. Each senior will be able to designate one course (outside of his major field) in which he wishes to receive either a "pass" or "fail" grade. He may make his choice any time before the half-way mark in the spring term.

Thomas M. Hill, professor of management who represented the Faculty Committee on Educational Policy in announcing the plan, noted the argument that "students are constrained by fear of the effects of low grades on graduate school admission from electing potentially interesting subjects outside their areas of competence."

"The purpose of this experiment," said Professor Hill, "is to test this hypothesis by comparing the choices of seniors partially freed from this constraint with those of previous classes." The Committee will study the results and eventually report on them, with a recommendation, to the Faculty.

Tallest Tree in Cambridge

A surrealistic roof garden, its decor ranging from radomes to a grapefruit tree "which is without question the tallest tree in Cambridge," is now in full bloom on M.I.T.'s Green Building.

The building is the tallest in Cambridge, and its roof provides an ideal meteorological station. Michael S. Meyers, '69 (with an assist from Gregory Nealand, the son of G. Edward Nealand, '32, who has been a part-time technical assistant in the Department of Meteorology), surveys the scene in *Tech Engineering News* for December.

The largest roof-top landmark is a 26-foot radome at the southwest corner, which houses an 18-foot paraboloid antenna used for a 10-centimeter weather radar system of which installation is nearly complete. The dish antenna is horn-fed; the transmitters are located on the nineteenth floor and the one megawatt output is carried to the roof by a waveguide system through the radome support column. The dish can be placed in any orientation from full vertical to 5° below the horizontal, through a full 360° rotation; the system gives a 1° bandwidth.

A smaller roof-top radome houses a CPS-9 radar system, converted from an army tracking radar to a weather radar by modifications of the antenna maneuvering equipment. A six-foot dish, controlled by a hydraulic servo system which "is subject to frequent breakdowns," operates at three centimeter wavelength.

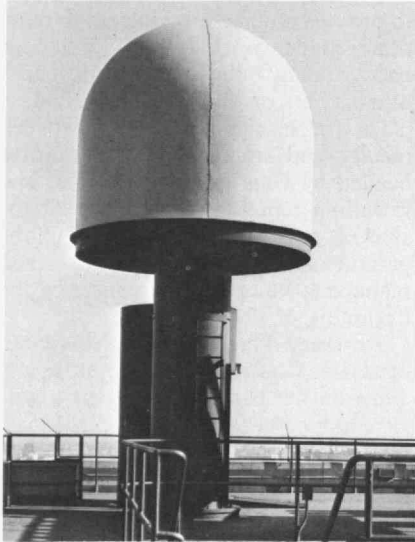
The display and control systems for both radars are located on the eighteenth floor, three levels below the roof, and there are additional displays in the sixteenth-floor meteorology plotting room "to allow the meteorologists there to view the surrounding weather conditions without the opportunity to meddle with the radar controls." The main displays each provide a combination of the familiar "P.P.I." and the more useful "R.H.I." (range height indicator), from which the Meteorology Department hopes to produce instantaneous computer evaluation of short-range weather prospects. The plan is that the computer, by analyzing the height, size, and intensity of radar-target storms, will translate the radar returns into predictions of rainfall, winds, storm life, and probable course.

Tall buildings on the M.I.T. campus were a hazard to effective radar from the former location in a penthouse on Building 24. But now the radars are shadowed only by distant Boston buildings which cause only small "wedges" in the displays.

M.I.T.'s highest eminence is the Green Building, where the Department of Meteorology has erected domes for two radar antennas and a plexiglass polydome (transparent to radio waves) among whose tenants is the tallest (grapefruit) tree in Cambridge.

PHOTO: LAWRENCE LOWRY

PHOTOS: MICHAEL S. MEYERS, '69



An Institute Gazette

Other features of the Green Building rooftop are a balloon launching shelter, an instrument tower, numerous instrument mounts and a plexiglass dome. The balloon shelter provides protection for weather balloons and their payloads during inflation and launching, while the instrument tower carries wind and temperature sensing equipment above the influence of the rest of the roof's paraphernalia.

The plexiglass dome is a unique radio observatory: because it contains no metal (its sections are fastened together with nylon bolts), it is almost completely transparent to radio waves. Its principal purpose is to house an experimental polarized radar; it is also being used by several M.I.T. departments for such studies as laser transmission and atmospheric effects on telemetry, and it is the home for a small collection of plants including the not-so-small grapefruit tree.

Precision Bearings

Several hundred representatives of industry, government, and universities in the U.S., Canada, and the United Kingdom came to M.I.T. in December for an Instrumentation Laboratory symposium on the design and production of high-precision ball bearings and gas bearings, principally as applied in gyroscopic instruments.

The symposium purpose was to extend the results of research on the design and construction of precision bearings which has been undertaken in all the countries involved—and notably in the United States under the leadership of the Instrumentation Laboratory and of industrial groups involved in developing inertial guidance, navigation and control systems.

Symposium co-chairmen were William G. Denhard, '42, associate director of the Instrumentation Laboratory, and Albert P. Freeman, '49, deputy associate director; both have had long-time association with the Laboratory's development of single-degree-of-freedom gyroscopes in which the spinning wheel floats in a viscous fluid to eliminate random oscillations and respond with greatest precision to external forces. Gyroscope bearings are a critical factor in the precision, reliability, and long life of important navigation systems.

The attention to it in the symposium program suggested that lubrication is the single most critical problem in the design of precision ball bearings. Recent research suggests that there is no metal-to-metal contact when lubricated ball bearings run at high speed; the

bearing elements literally "float" on an ultra-thin coat of lubricant. Gas bearings also operate hydrodynamically; but the M.I.T. conference program suggested that design, manufacturing and quality control problems are of special importance in this field.

Heartbreak House

Though to some it seemed unfortunately overshadowed by a recent campus appearance of the professional Theater Company of Boston, M.I.T.'s Dramashop won laurels from its audiences and from Ray T. Hagstrom, '69, *The Tech's* reviewer, for its pre-holiday performances of George Bernard Shaw's "Heartbreak House" under the direction of Joseph D. Everingham, M.I.T. director of drama.

The cast, said Mr. Hagstrom, had "the wide spectrum of talent and experience evident in the best of amateur productions." He gave special commendation to Joan Tolentino, a young Cambridge actress, Lisa Kelley, a student at the Winsor School, and Robert L. Moore, '68. The first act performance was "sparkling," said Mr. Hagstrom; "even the most demanding audience would have been satisfied with this portion." Some of the sparkle wore off in the second act, but the third act found "animation revived, and the play proceeded to a lively finish."

Professor Everingham was assisted by Helen B. Brumby and Edward S. Darna; sets were by William C. Pan, '67, and lighting by William B. Zimmerman, '68. Alan R. Hirsch, graduate student, was stage manager.

"Good acting coupled with an excellent play" gave the M.I.T. Dramashop a hit when it presented George Bernard Shaw's "Heartbreak House" in Kresge Little Theatre in mid-December, according to *The Tech's* reviewer.

Space vs. Protocol

Fourth-year architecture students thought their classroom was too crowded; so they designed and built (in three days, with junk parts) a tinker-toy-type mezzanine to increase the space per student.

Then came trouble, according to this report by D. Cary Bullock, graduate student, in *The Tech*:

"The Physical Plant Department, which is responsible for 'all structures on campus,' has said the complex would have to be disassembled. Initially they reasoned that it was unsafe. But when the safety crew was consulted, it was discovered that the structure was very sound. (The students had the advice of one of the structural faculty, according to John H. Terry, '67.) The only recommendation made was that sprinklers be installed to protect against fire.

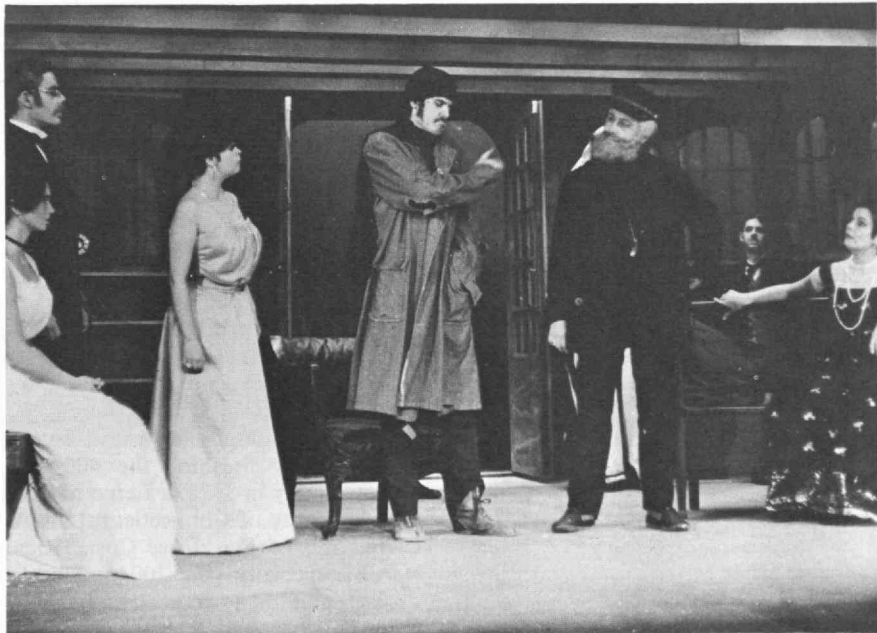
"The trouble," says Mr. Terry, 'is that they look at these as architecture classrooms. They should look at these rooms as architecture laboratories. We should be able to build the environment in which we are to work. What we have done should be an annual project in design for fourth-year students.'

"Another student said, 'We have been told that the main objection to the complex is protocol. The Physical Plant people are upset because they weren't consulted. They don't want this incident to set a precedent.'

"But the students have been notified that their project will be taken down December 23."

It was.

PHOTO: WILLIAM A. INGRAM, '68, FROM THE TECH



Winter Sports: Openers

The first third of the winter sports season was topped with "the most exciting" basketball game in 59 years of the sport at M.I.T. Cheered on by a record-breaking 1500 spectators, the varsity clung to sudden death through two overtime periods against Dartmouth, finally lost 70-68. The affair ended a five-game winning streak in which Bowdoin, Trinity, Hartford, Wesleyan, and R.P.I. had fallen during the first two weeks of December.

Basketball honors go to David G. Jansson, '68, who leads the scoring and is "the driving force behind the past, present, and future successes of M.I.T. basketball. When the situation is at its roughest, that's when Jansson shines," says Coach John G. Barry. This year's early-season record is promising enough to give M.I.T. followers post-season tournament hopes, though the Institute has never before been in serious contention for the New England College Tournament. At the beginning of the Christmas holidays, N.C.A.A. statistics ranked the team 16th in the nation on team defense and tenth in field goal percentage.

Other sports highlights of the early winter:

- M.I.T.'s top skier, Helge K. Bjaaland, '67, of Oslo, Norway, was picked by the U.S. Eastern Amateur Skiing Association for a training camp at Lyndonville, Vt., during the Christmas holidays.

- Freshman running star Ben T. Wilson, '70, turned in an impressive triple at an indoor meet at Tufts by winning three events—the mile (4:26), the two-mile (9:56), and the 1000-yard (2:24)—in one day. Except for his performance, the meet would have been "a total disaster" for M.I.T., said *The Tech*. At Bowdoin earlier in the season Stanley M. Kozubek, '69, and Stephen J. Sydoriak, '68, set local records in the mile (4:29.3) and the pole vault (13'6"), respectively.

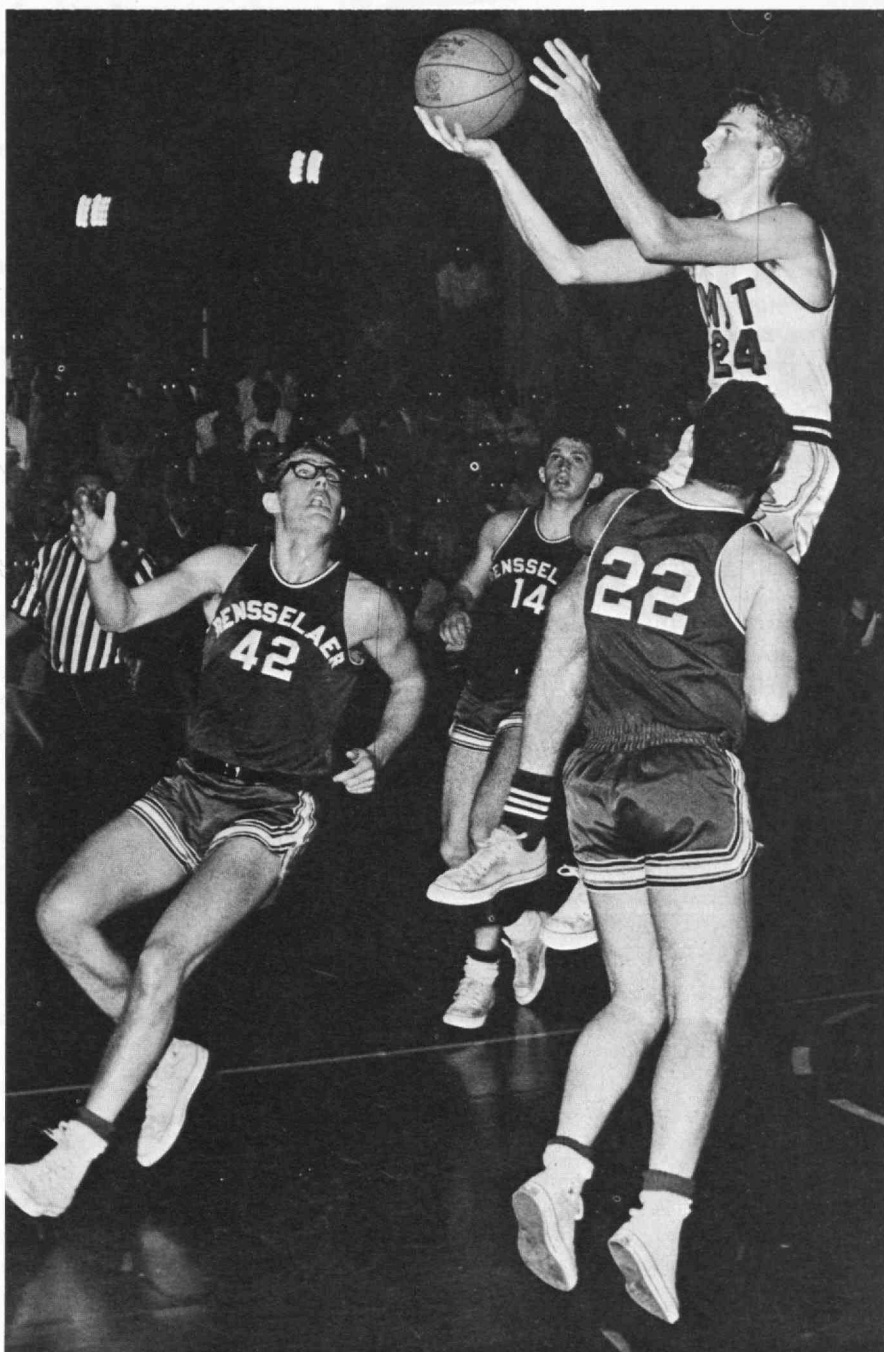
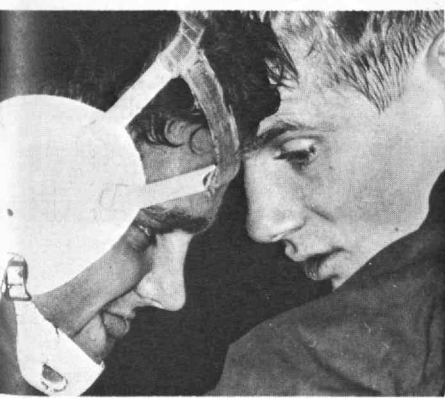
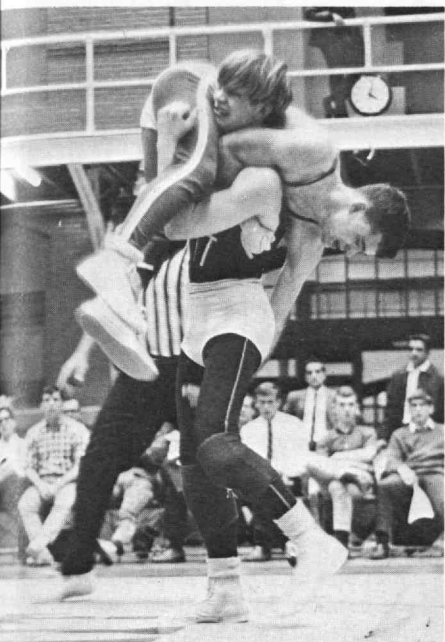
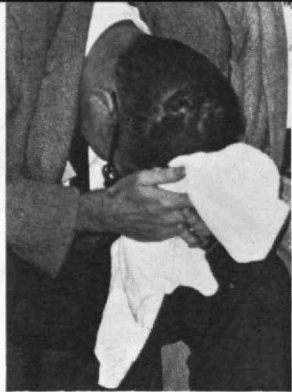
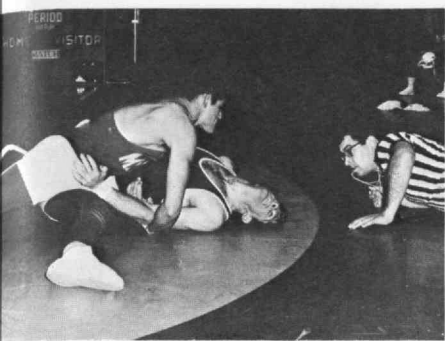
- In their only pre-Christmas match, the co-ed fencing team came up to the last match in 25 against Brandeis with the score 12-12—and lost it. Sharon Grundfest, '69, and Gwenyth Jones, '70, each won three out of five bouts to lead the scoring for M.I.T.

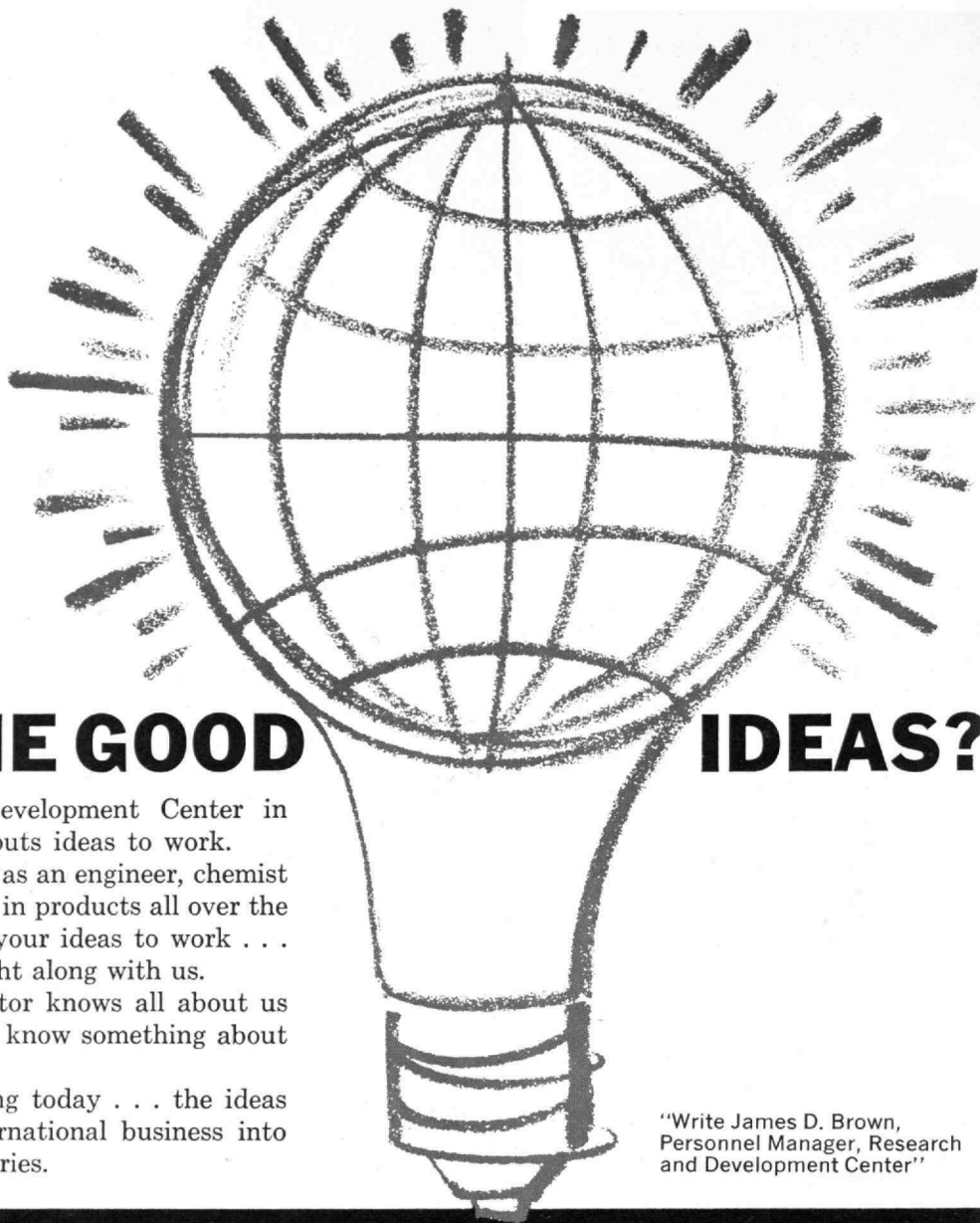
- Beating Bowdoin to open the season, the M.I.T. swimmers topped a record of 3:30.1 by finishing the 400-yard freestyle relay in 3:28.0. Later, against the University of Connecticut, Luis A. Clare, '69, of San Jose, Costa Rica, won his specialty (the 200-yard backstroke) and then went right back to swim the 500-yard freestyle, in which

A pot-pourri of winter sports to show how M.I.T. spends its afternoons and evenings: fencing instructions from Coach Silvio Vitale; M.I.T.'s Thomas R. Newkirk, '67, tangles for a puck in a hockey game which eventually went to Massachusetts, 6-1; freshman wrestler Walter C. Price, Jr., repeatedly puts his Harvard opponent on the mat but cannot pin him there, but Gregg H. Erickson, '69, slams Williams' John Zimmerman for a takedown while Regan J. Fay, '70, collects some pointers from freshman wrestling coach Robert A. Wells, Jr.; and David G. Jansson, '68, stars against Rensselaer (the final score was 70-54) but keeps basketball coach John G. Barry alternating between despair and exaltation.

PHOTOS: JEFFREY M. REYNOLDS, '68







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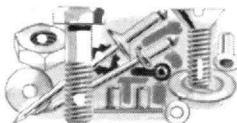
"Write James D. Brown, Personnel Manager, Research and Development Center"

CHEMICAL SYSTEMS



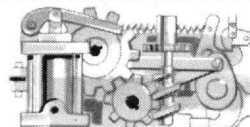
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he took second. At Tufts Clare broke a local record in the 200-yard individual medley and a 14-year record in the 200-yard backstroke.

• The first gymnastics meet at M.I.T. in 30 years found the Institute's club, sparked by five freshmen, running over Dartmouth 67-21 with clean sweeps in the horizontal bar, parallel bars, and still rings and firsts in every event except the free exercise.

1967 Summer Programs

Thirty-nine short "special summer programs" are scheduled for 1967 at M.I.T.

Lasting from one to two weeks, the programs are planned for professionals who want to update their knowledge in special fields or branch out into new areas. Most are concerned with topics of current Institute teaching and research interest.

The 39 programs are:

Architecture—Form and Color, July 17-28: an analytical approach to the use of color in the ultimate clarification and refinement of form, at the object and architectural scales; Plastics in Architecture, June 19-23: the properties and uses of plastics in buildings.

Chemistry—Infrared Spectroscopy: two one-week programs, one (June 19-23) on the theory of infrared spectroscopy and optical and electronic systems and one (June 26-30) on applications to chemical and biological problems; Fundamentals of Photochemistry, July 17-28: chemical actinometry, quantum yields, and other aspects of photochemistry.

City Planning—City and Regional Planning, June 19-30: the 19th annual seminar, this year emphasizing problems of institutional expansion in an urban setting; Religion and Community Cooperation, July 24-28: the changing role of the church and the possibilities for cooperation between churches and community and government agencies in the solution of urban problems.

Civil Engineering—Soil Mechanics, August 28-September 1: basic principles and applications of finite element techniques in soil mechanics; Ground Water Hydrology, June 19-30: theoretical, experimental and practical phases of ground water hydrology and aquifer hydrodynamics.

Economics—Forecasting with Econometric Models, August 14-25: methods of formulating, estimating, and using statistical models for economic forecasting; Mathematical Programming, August 28-September 9: theories of linear and nonlinear programming and optimal control, with numerical techniques and applications.

Electrical Engineering—On-Line Circuit Design, July 6-13: use of on-line digital computer utilities for analysis and design of electronic circuits; Noise and Vibration Reduction, August 7-18: noise control in buildings, machinery, vehicles, and special environments, with emphasis on new developments; Signal Processing, August 21-September 1: modern techniques for the separation of combined signals, detection of signals corrupted by noise, estimation of signal parameters, and efficient encoding of signals.

Management—Computer Simulation of Market and Competitor Response, June 13-23: procedures and techniques of developing, validating, and implementing computer-based microanalytic market simulations; Industrial Dynamics, June 13-23: quantitative study of flows of information, orders, capital equipment, material, money, and manpower and its implication for management decisions; Management Planning and Control Systems, June 13-23: modern analytical techniques, recent advances in information technology, and information systems for planning and control; Management of Research and Development, July 10-21: behavioral research, economic research, and systems analyses on problems affecting planning, controlling and organizing research and development; Management Science in Marketing, August 21-September 1: recent advances in the application of management science to marketing; Marketing Information Systems, Au-

gust 21-September 1: marketing measurements and data, marketing models, and their use in new marketing information systems.

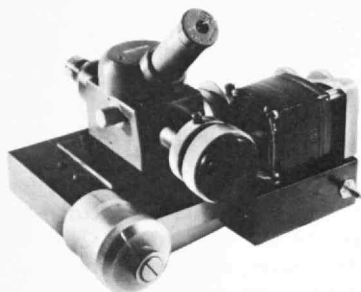
Mechanical Engineering—Photoelasticity and Moire Techniques, June 19-23: applications of polarized light and interference grid techniques for measuring strains and displacements; Strain Gage Techniques: two one-week programs, the first (July 10-14) providing lectures and demonstrations on wire, foil, and semi-conductor strain gages, the second (July 17-21) offering laboratory exercises in the use of equipment; Physical Measurement and Analysis, June 13-23: statistical interpretation and dynamic analysis of measurements and measurement apparatus; Nondestructive Testing, June 26-30: new techniques, including magnetic particle, fluid penetrant, X-ray, ultrasonic, and eddy current methods of non-destructive testing; Two-Phase Gas-Liquid Flow and Heat Transfer, July 10-21: thermo-dynamics and fluid mechanics of two-phase gas-liquid flows, surface phenomena, and bubble and drop nucleation; Physical System Dynamics, July 24-28: analysis, simulation and design of sophisticated devices, processes, and systems in terms of overall system behavior; Modern Kinematic Developments, July 24-August 4: systematic analysis and synthesis, through computer techniques, of four-bar linkages and other motions in the plane and in space.

Metallurgy—Surfaces, Nucleation and Crystal Growth, July 10-21: the

M.I.T.'s telephone system is the third largest in New England (behind Raytheon and General Electric), but it is actually the largest single installation in the six-state area. Its growth is the result not only of the increased numbers of Institute people who use telephones; computers, too, are tied together and to their users through the same system. Morton Berlan, M.I.T.'s new communications officer, estimates that within the next decade computers will account for more than 60 per cent of national long distance telephone use.



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Anthony D. Kurtz, 1951

Ronald A. Kurtz, 1954

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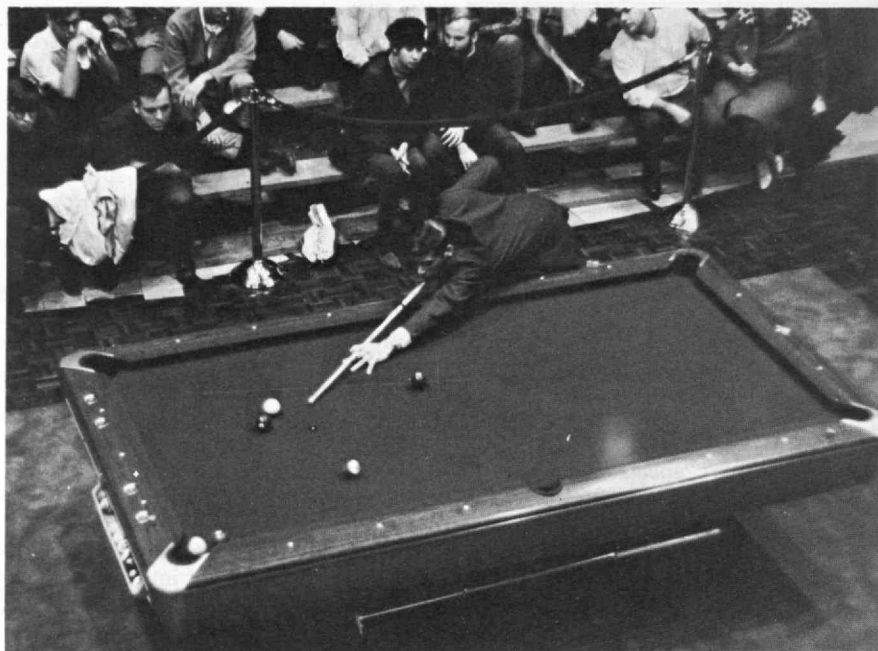


PHOTO: JEFFREY M. REYNOLDS, '68, FROM THE TECH

The match was tight and the gallery crowded, but Douglas M. Friedman, '67, made his shots and kept the pocket billiards championship of M.I.T. for the second straight year.

An Institute Gazette

structure and properties of surfaces from the macroscopic and microscopic viewpoints, especially those aspects related to nucleation and crystal growth processes.

Naval Architecture and Marine Engineering—Ocean Transportation, July 10-14: recent analysis techniques, design changes and operational methods to improve the effectiveness of ocean transportation; Automated Ship Production, July 17-21: current status and new techniques, processes and methodologies of production, control and management of ship production.

Nutrition and Food Science—Fermentation Technology, June 19-23: theories, techniques and applications of continuous culture; Growth and Development Pertinent to Orthodontics, June 26-30: growth and development in terms of oral biology and pathology at the molecular, cell, tissue, and organ levels; Quality and Engineering Factors in Food Processing, June 26-30: applications of microbiological, chemical and engineering principles to the production of processed foods.

Nuclear Engineering—Nuclear Power Reactor Safety, August 21-September 1: safety problems and their solutions in the design, construction and operation of nuclear power reactors.

Oceanography—Small-Scale Processes at the Ocean-Atmosphere Interface, June 26-30: the dynamics of processes which occur in the atmosphere and in the sea near the sea surface.

Operations Research—Operations

Research in Public Systems, September 5-9: applications of the operational methodology to problems in community health, urban planning, transportation systems, police operations, and other public systems.

Statistics—Design and Analysis of Scientific Experiments, August 7-18: statistical theory underlying modern experimental designs and their analysis.

Technical Writing—Communicating Technical Information, June 18-23: principles which underlie successful communication for engineers, scientists, technical writers, editors, and publication managers.

Tuition charges for the special summer programs range from \$200 to \$800, depending on the field and length of the program. Full details and registration forms are available from the M.I.T. Summer Session Office.

Last summer 1,787 people came from industry (54 per cent), government (29 per cent), and education (17 per cent) to attend special programs; their average age was 37, and 45 per cent of them held bachelor's degrees as their highest degrees, according to James M. Austin, '41, summer session director. Only 9 per cent of them were M.I.T. Alumni.

Admissions: No Change

So far, the evidence from preliminary applications and other indicators is that there will be "little appreciable change" in the number of final applications to M.I.T. received by the Admissions Office for the Class of 1971, Roland B. Greeley, Director of Admissions, has told *The Tech*.



The world's foremost center of industrial engineering could be Building 56.

There it is. Would you like to work there?

"Industry has gone a long way toward satisfying those human needs which can be reached through money, benefits, and security. The future points to the job itself through improved job design as a source of increased performance and satisfaction."

That's what we say in a new paper coming out of Building 56. It relates the job design function of the industrial engineer to the sciences that study human behavior. Such a paper would not have come out of a company where top management is less than sold on the benefits of leading the field in applying the most advanced concepts in industrial engineering no less than in chemical, mechanical, or electrical engineering. We have a balance sheet to prove that our management knows which way is up.

Industrial engineers can come into Building 56 either from college, from graduate school, from military service, or from a well-reasoned decision that their present employment is not what they want for the long haul.

Once in and with a little time gone by, choice confronts a good industrial engineer. Does he want to

remain an industrial engineer and enjoy a status in his profession that may be more difficult to attain for industrial engineers who practice under conditions less favorable than prevail at Kodak? Or do multiple regression technique and mathematical model building and behavioral research mean less to him than swinging over to one of Building 56's intramural clients and there starting his way up to where the whole mighty, fascinating, and gloriously diversified ship is steered?

The fact that parallel choices have to be made by those who join us as chemical, mechanical, or electrical engineers will not be mentioned here for lack of space.

We'd be honored to have a note about yourself. Write Business and Technical Personnel Department, EASTMAN KODAK COMPANY, Rochester, N.Y. 14650.

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Opportunities at Anaconda

in mining and metallurgy here and abroad, at Anaconda American Brass Co., Anaconda Wire & Cable Co., and Anaconda Aluminum Co.



Extractive metallurgy is a key to more metal

The metallurgical bubble bath above is a flotation cell in a new Anaconda concentrator. Although it may seem crude and simple to a layman, the process involves complex combinations of colloidal and surface chemistry, crystallography, physics, and special grinding methods adapted to the ores at each individual mine. It represents one way Anaconda's metallurgical research is helping make more metal available for our growing economy.

At Butte, Mont., such research, in raising recovery of metal from low-grade ores, is making today's submarginal material part of tomorrow's ore reserves.

As Anaconda's intensified geological research and exploration turns up new prospective mineral deposits, the need for metallurgical research and development grows. Each deposit must be analyzed to determine the feasibility of recovering its metal. And as research develops more efficient extraction processes, lower grade and more complex deposits can become mines.

To accomplish this, Anaconda is establishing a central extractive metallurgical research center at Tucson, Arizona. It is carefully planned and is being superbly equipped. It is near a large university staff, which can be consulted as needs arise, thus offering a stimulating environment for progressive research and development. In turn, this means attractive new openings for a variety of engineering talents—not only in metallurgy, but also in chemistry, physics, and mechanical engineering.

Dynamic test yields new data on copper-metal springs

Copper metals are among the most useful spring materials known to man. The role of modulus of elasticity in this application was studied at the Research and Technical Center of Anaconda American Brass for more precise data and to make possible predicting spring performance at various ambient temperatures.

Modulus of elasticity can be determined by physical testing in tension or compression. But Anaconda found the dynamic method (below) easier to perform and just as accurate.

Results are of prime importance to designers of spring devices. The significantly lower modulus of elasticity for copper metals means that at the same level of stress, copper alloy components will deflect or extend almost twice as far as components made of steel—usually with no sacrifice of maximum stress. This can mean more sensitive controls—or “softer” action in the absorption of energy.

This is but one way Anaconda is refining and broadening knowledge of the many useful properties of copper met-

The talents and skills of technically qualified men and women will always be needed by Anaconda in important positions in exploration, mining, extractive metallurgy, manufacturing, scientific research, sales, and administration.

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als. Such research opens vast new opportunities for growth—career opportunities at Anaconda American Brass for college graduates in all fields of engineering, in business administration, and sales.



Bright future for a bright metal

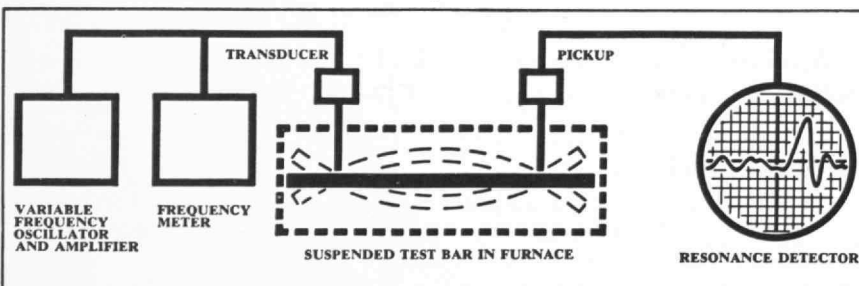
How do you make containers to hold motor oil or citrus concentrates at lower costs? How can you package airline in-flight meals to enable reconstituting of foods at very high temperatures for fast serving—and retain quality and flavor? These are typical questions asked and answered in the Packaging Development Laboratory of Anaconda Aluminum.

A growing factor in the aluminum industry, Anaconda Aluminum is particularly strong in packaging—with plain foil, laminated foil and rigid foil container products. And it has developed several firsts in the aluminum industry. One is the patented foil-fibre container for motor oil and for citrus concentrates. Another is foil containers (see above) for better airline service in the jet age. Now frozen and refrigerated meals can be heated rapidly and served quickly. Anaconda Aluminum has an outstanding record of developments which have had a tremendous impact on the packaging industry.

Anaconda Aluminum is also a producer of primary aluminum. To meet the growing demand for the metal in packaging, transportation, electrical, and building products, Anaconda Aluminum has been steadily increasing its output—is currently expanding its primary ingot capacity by two-thirds. This expansion involves an investment of \$50,000,000.

Anaconda Aluminum is growing, and will become an increasingly important factor in the bright future of the bright metal. For this it needs people—not only for its packaging laboratory and foil operations, but also for its other fabricating plants and reduction operations. This means growing opportunities for metallurgists, chemical engineers, industrial engineers, plant engineers, and system engineers.

66125



Left: Dynamic test for modulus of elasticity. Oscillator changes frequency until test bar begins to vibrate. From natural frequency shown on oscilloscope, “dynamic modulus” can be computed.

An Institute Gazette

The post-war boom in college applications may be ending. The number has been levelling off for the past two years. "The biggest 'booms' came in the 1964 and 1965 entrances," he said. But he explained that because of the Institute's greater selectivity it does not feel the pressure of numbers and the changes in demand as sharply as many universities.

Meanwhile, follow-up on its results has indicated the success of a joint student-Admissions Office project conducted early last summer to acquaint high school guidance personnel and students with the Institute. Under the program, about 50 M.I.T. undergraduates called on their own high schools to talk with guidance personnel and interested students and teachers. The student Public Relations Committee, which developed the plan, is now talking with the Admissions Office about its renewal in the spring of 1967.

Premedical Counselors

A new program for advising premedical students at M.I.T. goes into effect this spring. Under it, the advisory responsibilities heretofore carried solely by Dr. Harriet L. Hardy of the Medical Department will be shared by a Premedical Advisory Committee; Associate Dean Emily L. Wick is chairman.

At present just over 50 undergraduates are known to be planning to attend medical school, and 27 of these are seniors who hope to enter in the fall. Biology is the most common premedical major at M.I.T., with humanities a close second.

The new program will increase the service available from M.I.T. to premedical students, in planning both their M.I.T. academic programs and their medical careers. It will operate from a headquarters with information files for students' use; it will sponsor guidance meetings on medical career problems, and it will draw on a broad group of counselors to help meet individual student's needs.

Big Band Jazz

Alumni who talk about the "Tectonians" are dated, and those who do not know jazz are square. Now it's the Concert Jazz Band, and its specialty is "big band jazz," for which there is a lively concert following among the Institute community.

Much of the credit goes to Herbert Pomeroy, who is called by devotees "one of the foremost jazz educators in the country." Mr. Pomeroy teaches at the Berklee School of Music in Boston, leads the M.I.T. Concert Jazz Band,

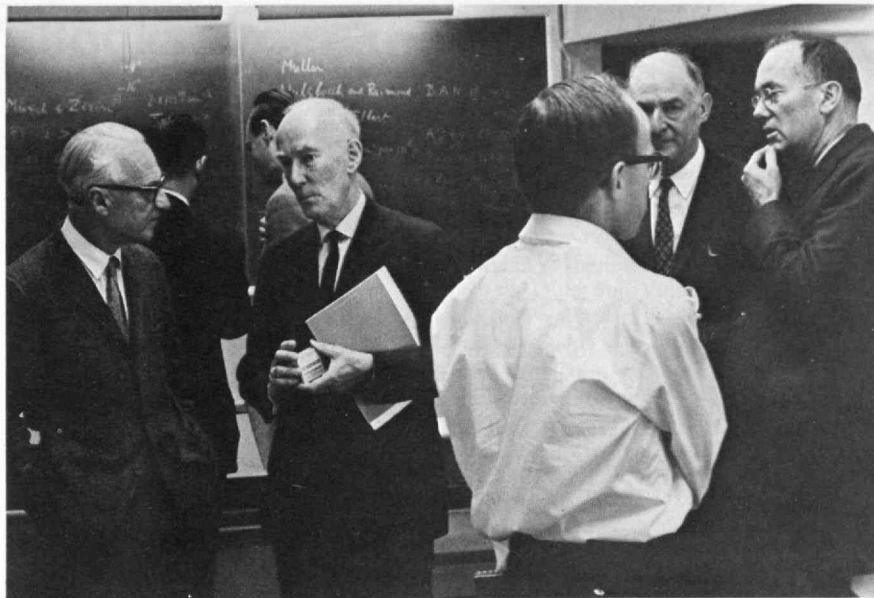


PHOTO: SMITHSONIAN ASTROPHYSICAL OBSERVATORY

An inter-institutional audience assembled when the Dutch astronomer Jan Henrick Oort, director of the Leiden Observatory, spoke at Harvard and the Smithsonian Astrophysical Observatory. In the picture are Bruno Rossi, Professor of Physics at M.I.T.; Dr. Oort; Patrick Palmer, Harvard astronomy student (back to camera); Leo Goldberg, director of the Harvard College Observatory; and Charles H. Townes, Institute Professor at M.I.T.

and (in the view of Jack Bernstein, '67, writing in *The Tech*) should be giving a Department of Humanities seminar "in what has correctly been described as this country's single unique contribution to musical form."

The band's fall concert in December was the occasion for kudos for many of its members. The Institute "has a special blessing," said *The Tech*, in Samuel F. Alongi, '69, who "just happens to be the best jazz trumpeter in the Greater Boston area." That December concert included a "rather uninteresting" work by Richard S. Orr, a graduate student who is himself a member of the band,

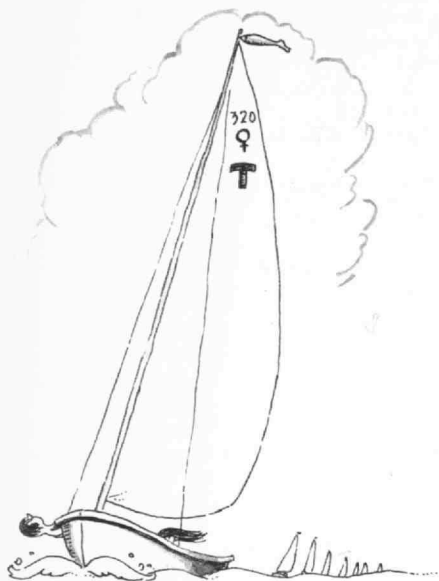
but the arrangement had the virtue of giving the audience a chance to hear the "excellent" piano and brass work of Brage Golding, Jr., a graduate student, and Stuart M. Schulman, '68, who were "usually obscured by the heavy brass arrangements." In the same work, Mr. Orr's valve trombone solo was described as "just a delight, in the best tradition of Bobby Brookmyer." (Orr is also "an outstanding soloist" on the slide trombone.) There were some sextet arrangements in the concert, and here David M. Kettner (graduate student) took a bow for his work on the drums.

Richard J. Carter, graduate student, performs on the saxophone, while Herbert Pomeroy (with his back to the camera) conducts the Jazz Band at its December Concert.

PHOTO: JOHN F. RODERICK, '70, FROM THE TECH



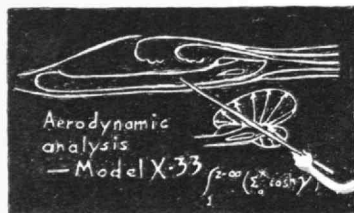
MIT athletes are engaged in a great diversity of sports....inter-collegiate, intramural, and club. Some will come as a surprise to alumni.



Coeds first in Man Lab Regatta; win trophy for third straight year



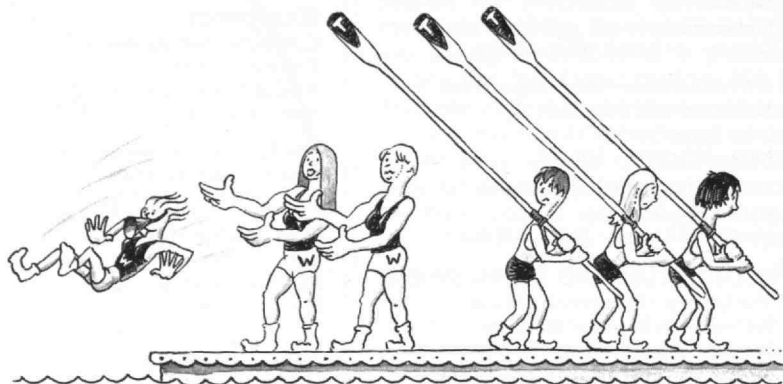
Tech ruggers win twice



Tech canoeists plan for Olympics

And then there are other sports that didn't make the headlines, such as

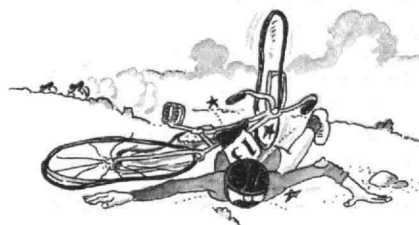
~~~~~ Judo, Cricket, Archery, in Alumni Pool,



**Wellesley crew tops MIT coeds**



**Gymnasts top Dartmouth**



**Cyclists defeated at New Haven**



**Scuba and WhiteWater Clubs, both of which practice**



**Quarterfinals scheduled for tomorrow morning in Tech pocket billiards**



... and the most popular sport by far (although as yet unrecognized). Beating The Computer!

H-B-KANE



## Debaters and Others

Having opened the season with fifth- and ninth-place standings in the annual Georgetown Invitational Debate Tournament (out of 110 teams entered), the M.I.T. Debate Team claimed third in the invitational tournament at the Air Force Academy in December.

Thirty-six colleges were in the Air Force tourney at Colorado Springs, where M.I.T. won six starting rounds, beat the University of Oregon in the quarter finals, finally went down to Augustana College (Rock Island, Ill.), whose team also defeated Dartmouth to take the tourney. The M.I.T. representatives were Eric C. Johnson, '67, and James J. Foster, '67. They and William B. Arthur, '69, and Barry Rosenbaum, '70, had been at the earlier Georgetown tourney for M.I.T.

Meanwhile, Lawrence C. Kaufman, '68, won the American Open Chess Championship in Santa Monica, California early in December.

## Individuals Noteworthy

**Lucian D. Pye**, professor of political science at M.I.T., has been named by the Department of State to an advisory panel on East Asian and Pacific affairs.

**Kenneth P. Armstrong**, '10, was awarded a plaque by the city commission of Opa-locka, Fla., in recognition of his nine years of service as a member of the city's planning council.

The University of Illinois has announced the appointment of **Francis O. Holmes**, '21, as visiting professor of botany; **Roy A. Axford**, '52, as associate professor of nuclear engineering; **Joseph E. Crowley**, '62, as assistant professor of electrical engineering; and **Michael S. Gelick**, '66, as assistant professor of architecture.

**Joseph H. Keenan**, '22, professor of mechanical engineering at M.I.T., has been elected an honorary member of the American Society of Mechanical Engineers.

**James R. Killian**, '26, chairman of the Corporation, is now on the board of trustees of Washington University.

**William R. Jackson**, '30, president of Pittsburgh-Des Moines Steel Company, has been reelected treasurer of the American Institute of Steel Construction.

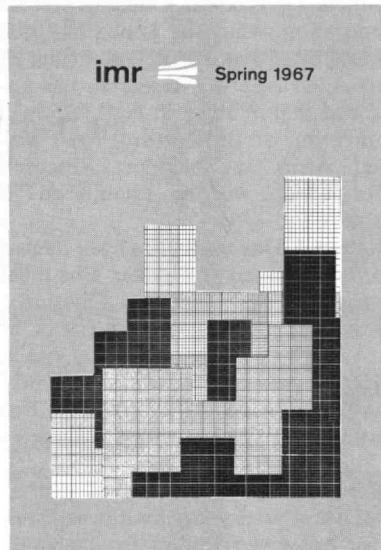
**Manson Benedict**, '32, received the 1966 Founders Award of the American Institute of Chemical Engineers in recognition of his contributions to the field. He was also recently made a director of the Atomic Industrial Forum.

**Robert B. Follansbee**, '32, is chief engineer for the Portland (Maine) Pipe

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## An Institute Gazette



J. G. Benson, '35



R. F. Flood, '35



J. F. Libsch, '40



N. C. Michels, '41



A. M. Pedraza, '41



B. H. Nieder, '43



D. P. Robinson, '56, (right) at  
Mystic Seaport



J. Peterson, '43



P. W. Plumley, '50



W. G. Austen, '51



J. Psarouthakis, '57

Line Corporation.

**Robert F. Flood, '35**, is now vice-president of Union Carbide Corporation and **J. Goffe Benson, '35**, is president of the corporation's Linde Division.

**Elmer F. DeTiere, Jr., '39**, is assistant chief engineer for the Rochester Products Division of General Motors Corporation, which he joined in 1955.

**John W. Pocock, '39**, president of Booz-Allen Applied Research, has announced that **William J. Neff, '55**, will be director of the Institute of Combined Arms and Support Research Office which will be established in Kansas City, Mo.

**Robert J. Davis, '40**, has been named general manager of Hooker Chemical Corporation's International Division.

**Joseph F. Libsch, '40**, a member of the Lehigh University faculty since 1946, has been named to the recently established Alcoa Foundation Professorship of Metallurgical Engineering.

**Henry Faul, '41**, since 1963 professor of geophysics at the Southwest Center for Advanced Studies, is now chairman of the geology department at the University of Pennsylvania.

**Norman C. Michels, '41**, has been elected president and chief operating officer of Lee Wilson Engineering Company.

**Alfredo M. Pedraza, '41**, has been named sales manager of Industria Colombiana de Llantas, the South American-based subsidiary of B. F. Goodrich.

**Frederic W. Watriss, '41**, assistant treasurer of M.I.T., is now a trustee and corporator of the Charlestown Savings Bank.

**Albert J. Kelly, '43**, deputy director of NASA's Electronics Research Center, has been elected a Fellow in the Institute of Electrical and Electronic Engineers.

**Bailey H. Nieder, '43**, is marketing director for the Cleveland-based Central Division of the Carling Brewing Company.

**John Peterson, '43**, is now executive vice-president of Drew Chemical Corporation. **Robert W. Van Tuyle, '42**, is the corporation's president.

**Albert B. Van Rennes, '44**, is now technical director of Bendix International.

**Walter J. Loughlin, '46**, is now assistant manager of the addresser-printer engineering department of Pitney-Bowes.

**William H. Brett, '47**, is now a vice-president of Booz, Allen & Hamilton.

**John J. Flynn, Jr., '47**, is now plant

manager of the Winthrop Laboratories Division of Sterling Drug Incorporated.

**Martin Lessen, '48**, chairman of the department of mechanical and aerospace sciences at the University of Rochester, has been elected a visiting fellow at Clare Hall, a new graduate college at Cambridge University.

**Dr. William Haddon, Jr., '49**, has been appointed traffic safety administrator by President Lyndon B. Johnson.

**Peter W. Plumley, '50**, is now second vice-president and actuary at The Travelers Insurance Company.

**Suren A. Semonian, '50**, has been named research and development manager for chemical engineering development in the chemical division of United States Rubber Company.

**J. Lowen Shearer, '50**, professor of engineering at The Pennsylvania State University, received the Richards Memorial Award from the American Society of Mechanical Engineers for outstanding achievement in mechanical engineering within 25 years after graduation.

**Dr. W. Gerald Austen, '51**, is now professor of surgery at Harvard Medical School.

**Vaughan C. Chambers, '51**, has been appointed director of sales to printing and industrial markets for E. I. du Pont de Nemours and Company.

U.S. Air Force Colonel **James O. Cobb, '51**, has received a citation for "exceptionally meritorious service as deputy commander of the Arnold Engineering Development Center.

**Arthur K. Kerman, '53**, professor of physics at M.I.T., is a member of the visiting committee of the Bartol Research Foundation of The Franklin Institute.

**Charles K. Taft, '53**, was awarded the 1966 Achievement Award of the National Fluid Power Association.

**Gordon R. Lohman, '55**, is now director of research of the AMSTED Research Laboratories.

**Malcolm R. Blotner, '56**, is now manager of operations analysis for Lever Brothers Company.

**Donald P. Robinson, '56**, has been appointed Operating Administrator of Mystic Seaport.

**John Psarouthakis, '57**, is now assistant director of research in charge of physics and materials sciences at Allis-Chalmers.

**W. Lawrence Garvin, '58**, former assistant planning officer at M.I.T., is now assistant to the dean for architectural planning at Harvard Medical School; he succeeds **William H. Brown, '33**, who is in charge of architectural planning for a new medical school at Rutgers.

**John D. Sherman, '66**, is now senior research engineer at the Norton Company.



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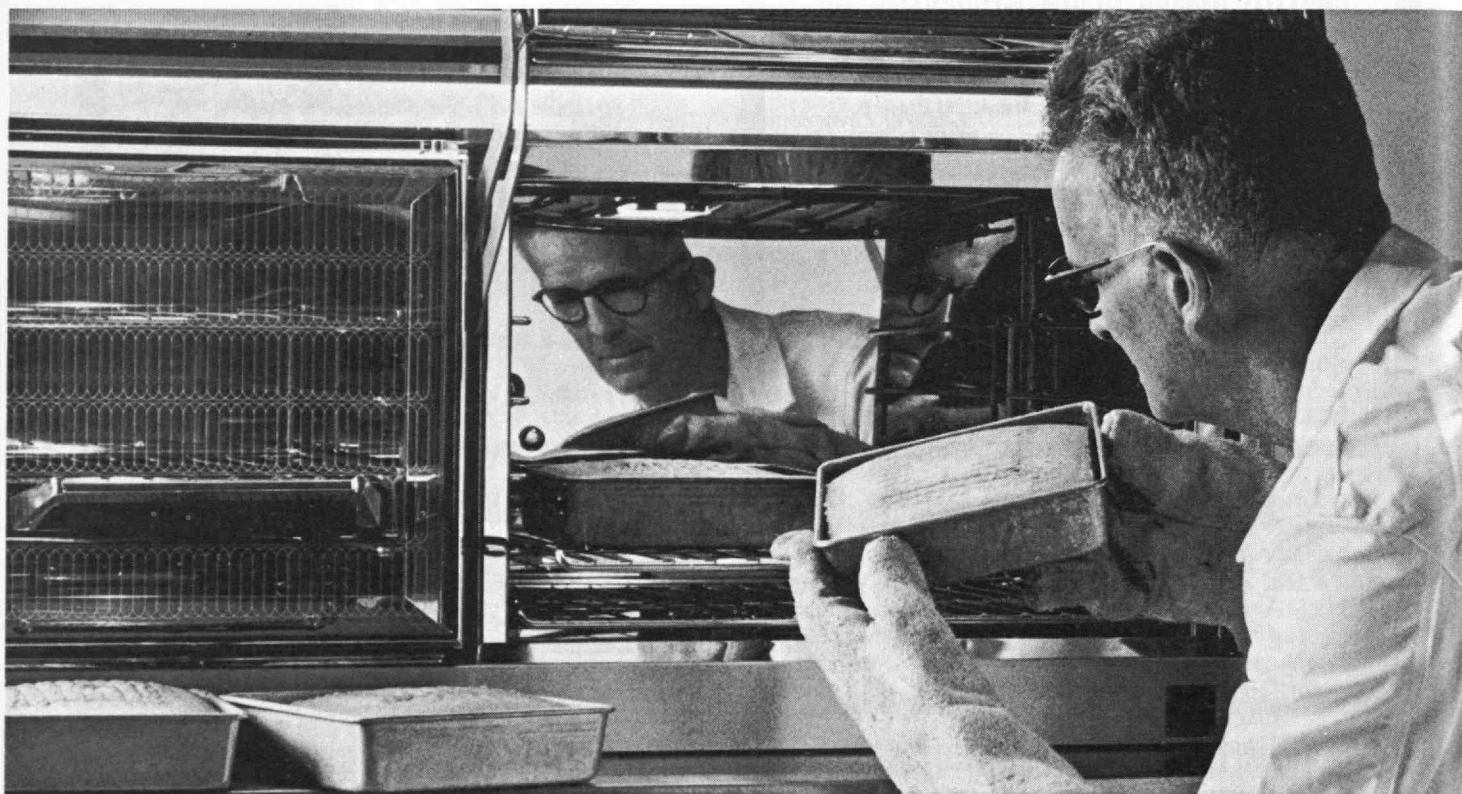
E. J. Healy '24

A. H. Kuljian '48

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## Youthful chef for the outdoor set now cooks up some answers for GM's Frigidaire



Dawn was breaking over Buckeye Lake in the summer of 1920. Over a campfire the tantalizing aroma of breakfast was in the air. And breakfast was the responsibility of young Lawrence Howdyshell, top cook in the troop.

It was at Buckeye Lake that "Howdy" developed his talent for cooking that paid off in later years when he became a range and oven-

tester at the Frigidaire Division of General Motors in Dayton, Ohio.

Now, "Howdy" bakes cakes and broils steaks—he cooks both fast and slow, with heats high and low, to test the performance of Frigidaire ovens and ranges. "Howdy" is one of the housewife's representatives at the factory, searching for anything that might cause complaints in the kitchen.

He started with Frigidaire in 1931 as an inspector of refrigerators, but for the past 13 years has devoted full time to testing ranges.

"Howdy" and men like him play an important part in the development of Frigidaire ranges. We're glad he's cooking for Frigidaire. His experiments in the test kitchens can make any housewife a better cook.

**General Motors is people making better things for you.**





## '96

A Christmas card from **George Harkness** arrived yesterday, "I am in Florida for the 26th winter; beautiful weather until last week which was cold—no frost as yet, which is the constant subject of conversation here in Orlando where oranges are big business." . . . A card from a freshman at Dartmouth, native of California, says he was colder last week than he had ever been and has been assured that the real cold will come later. . . . Plymouth afforded a brief respite from Boston smog and a visit from the chief engineer on the survey ship which leaves Woods Hole January 10th for Venezuela and southern waters and returns in July. An essential project for the government, the head of marine engineering said, is to learn to cultivate the oceans to give us food as the George's banks are not inexhaustible. It is evident that the government has already realized that the oceans must ultimately furnish food that the rapidly increasing population will demand.—**James M. Driscoll**, Secretary, 129 Walnut Street, Brookline, Mass.

## '99

**Frederick W. Grover**, VIII, has returned from a seven-weeks tour of central Europe in good physical condition in his young age of 90 years. . . . **Stuart A. Courtis**, VI, 92 years young, sends greetings from 22445 Cupertino Road, Cupertino, Calif. 95014. He sent a very thoughtful analysis of teaching methods in the changing world of science. . . . **Hervey J. Skinner**, V, joined the American Chemical Society in 1899, and the *Chemical and Engineering News* published a synopsis of his very remarkable professional life. He has recovered from a fall of last September. . . . Miss **Eugenia B. Frothingham** writes that her 93d birthday was a good day filled with greetings and pleasure. . . . As your class representative on the Alumni Council I was impressed with the dignified program, fine music and the beautiful background of the stage at the inauguration of Mr. Howard W. Johnson as President of M.I.T.—**Percy W. Witherell**, Secretary, 1162 West, Wrentham, Mass. 02093

## '01

The following classmates have passed away recently: **William T. Aldrich** who died on June 2, 1966. He was a prominent member of the class and will be greatly missed. . . . **Edward P. Beckwith**, V, S.B., died on July 5. . . . **Lyman H. Bigelow**, I, S.B., died in Hawaii on June 19. He was a valuable member of the class and attended several reunions. . . .

**Leonard D. Chandler**, II, S.B., died on January 24. He was connected for many years with the Abington Bank, finally as president. **Robert M. Derby**, I, died on February 14, 1966. He was for awhile president of our class and held several public offices, and during the last part of his life he travelled a great deal. He entertained the class at several reunions with accounts of his travels. . . . **Joseph P. Catlin**, VI, S.B., died on August 23, 1966. He was president of the Virkotype Corporation of Plainfield, N. J. . . . **Roland E. Simonds**, II, S.B., died on June 7, 1966. He and I were in the same section and saw a good deal of each other during our school life. After graduation, however, we were widely separated.—**Theodore H. Taft**, Secretary, 34 Lawrence St., Jaffrey, N.H. 03451

## '03

**Jose H. Aguilar**, I, has a new address, Ave. Morelia, 192 Apt. Hermosillo, Sonora, Mexico. . . . **J. Russell Jones**, III, new address is Forest Hills Subdivision, So. Boston, Va. . . . Our birthday greetings for their 90th to **Mary N. Phillips**, VII, October 17, 1876; **Frank Toohey**, II, November 24, 1876; for their 85th; **Charles B. Cox**, I, November 4, 1881, and **Robert J. King**, III, November 29, 1881. . . . We are obliged to announce the passing of **Richard F. Spamer**, X, 23 Jarvis Place, Lynbrook, N.Y., with no information and **Leroy L. Hunter**, I, 38 So. Dearborn St., Chicago. . . . A note of utmost interest to all our remaining classmates is the graphic picture of our 40th Reunion at New London, Conn., in the November 1943 Technology Review. As I have stated formerly, "Thar am gold in them yonder hills for more prospecten." Now to be frank. We daily devote too much time for reading financial and local affairs, but for wholly calm and restful mental relaxation, simply remove any M.I.T. Review from your library shelf and you will find yourself in the treasured atmosphere of former college days and renewal of your devoted course in science that is stimulating. I have another suggestion for the New Year that will be so helpful to your Secretary, to always write me of your nearby classmates when any news of interest pertains to them, from a newspaper note or otherwise. Too many of

## Happy Birthday

Happy birthday greetings go to 14 alumni this month. One alumnus will reach his 95th year, two their 90th, six their 85th and five their 80th.

February, 1872—**ROBERT D. FARQUHAR**, '95, on the 23d.

February, 1877—**LEWIS W. RIDDLE**, '99, on the 3d; **EMMA E. FERRIS**, '01, on the 9th.

February, 1882—**HARRY H. NEEDHAM**, '04, on the 3d; **HERBERT CALLMAN**, '06, on the 8th; **FREDERICK C. LUTZE**, '06, on the 14th; **LOUIS B. TUCKERMAN**, '06, on the 19th; **FREDERIC A. OLMSTED**, '03, on the 27th; **ICHABOD F. ATWOOD**, '03, on the 28th.

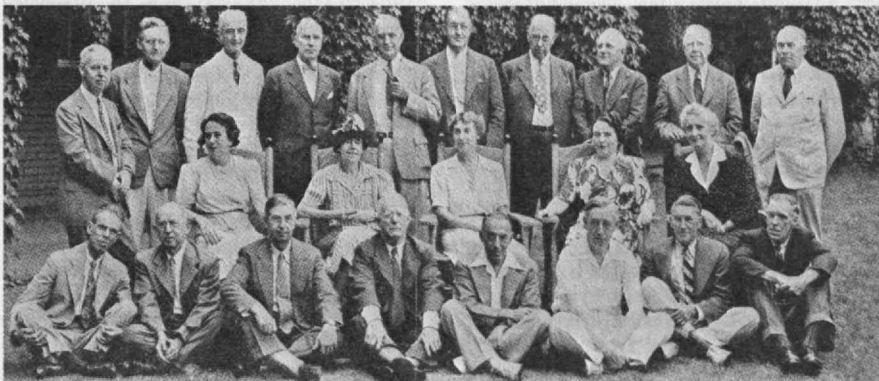
February, 1887—**GEORGE E. HODSDON**, '09, on the 7th; **ALBERT L. GARDNER**, '11, on the 11th; **KARL W. GASCHE**, '10, on the 17th; **ALLEN JONES**, '09, on the 22nd; **ALLEN W. REID**, '12, on the 24th.

our classmates pass on and the Alumni Office is too removed for their local or family information to accentuate our class news. . . . To complete our class souvenir picture to date, may I add **Clarence M. Joyce**, **George B. Bradshaw** are still with us. **Chester S. Aldrich** is deceased, **Robert J. King** and **Walter P. Regestein** are still present, **Harold Osborn**, **James A. Cushman** are deceased, **John J. Dooley** is still present. **Ralph B. Yerxa**, **Montague Ferry**, **Frederic A. Eustis** have passed on, but **John T. Chaney** and **Paul K. Parker** are still active; **LeRoy Gould** is deceased, **Myron H. Clark** and **Ichabod F. Atwood** still active, but **Raymond Haskell** and **Harry A. Stiles** are missing from our family tree.—**John J. A. Nolan**, Secretary, 13 Linden Ave., Somerville, Mass.; **Augustus H. Eustis**, Treasurer, 130 State St., Boston, Mass.

## '04

I had a pleasant surprise this week when I received news from the Alumni Office that **George Curtis** had moved to Needham, Mass., at 529 High Rock Street. I called him on the telephone and learned he is now living with his son at that address. George, if you remember, was the champion pole vaulter of the class of

Class of 1903, 40th Reunion—How many can you name?



1904. I hope to visit him soon. . . . Other changes of address are as follows: **Amasa M. Holcombe**, 125 Almedo Way, N.E., St. Petersburg, Fla.; **Franklin M. Chace**, Box 73, East Hampton, N.Y.; and **Lewis G. Wilson**, 6112 Marty Lane, Apt. 1, Shawnee Mission, Kans.—**Eugene H. Russell, Jr.**, 82 Stevens Road, Needham, Mass.

## '05

As I have said before, "it's either a feast or a famine"—news from '05ers, I mean. Perhaps I should add, "Pride goeth before a fall," but we did "have it made" for three issues. **Hal Robbins**, I, has always helped with a newsy Christmas newsletter, but he makes it brief this year: "I have discontinued the annual Christmas newsletters, so this will serve to report my survival for another year. My damage suit against the city of Phoenix for wrecking my ears has been postponed several times on account of the heavy backlog of pending cases in the Superior Courts, but it has been set for January 4th and is supposed to be definite this time. Aside from the ears I am still in good shape, and hope you are the same." . . . You will be interested in how **Herman Eisele** tells of his cataract operation: "This has been an arduous year for me. First, after Bertha's long illness, I had to work with various doctors in effort to get back to normal. For this I still have a long way to go. Then I had to make radical changes in my office primarily to reduce the space to conform to my planned reduced professional activity. In September I had a cataract operation which kept me in the hospital for two weeks and has confined me to my apartment ever since. The injections and other treatments given by the doctor took a lot out of me. I just received my first set of temporary glasses to which I am trying to get accustomed. I am not allowed to walk on the street alone. The most frustrating part of this procedure is the long time after the operation when you are not allowed to do much of any thing. It takes a lot of patience, but the prospects look promising." . . . **Herb Bailey**, V, has again included us in the mailing of his Christmas newsletter, but since it is primarily a family letter I am going to quote briefly: "My health has improved remarkably since my operation a year ago and, while I had some difficulty in getting my driver's license before my 86th birthday, I made it. Several hours most days I enjoy making bowls, tea sets and other things in my little "Pot Shop." I still go to the monthly meetings of our county school board in San Bernardino." The letter reveals that he is busy and happy with many varied interests. . . . I wonder how many remember **Fernando M. Blount**, IV? I cannot recollect knowing or hearing of him while he was at M.I.T. About fifteen years ago, while visiting a daughter in Pensacola, I looked him up. He appeared to be one of the outstanding citizens of Pensacola. At any rate he took me to a very fine restaurant specializing in sea food, took me around the city, showed me the sights etc., and we were

buddies, although neither of us could remember having ever seen each other. I never heard from him again until I received a notice of his death at Pensacola on November 26. I am quoting from an obituary: "Mr. Blount was born in Pensacola in 1882 and except for 10 years spent in the East, was a life-long resident. An architect, a builder and investment broker, Mr. Blount's career placed him at various times as member of the school board, chairman of the Escambia County Federal Relief Administration, a member of the Florida Welfare Board, and chairman of the Florida Merit Commission. Mr. Blount was educated at St. Paul's in New York, Yale, Harvard and the Massachusetts Institute of Technology where he was later a football coach, a task he also performed at the University of Alabama. He became president of Blount Construction Company in 1910 in Pensacola; the Pensacola Shipbuilding Corporation in 1918; and later, F. M. Blount, Inc., a brokerage firm. He was a former president of Pensacola Maternity Hospital; former director, State Children's Home Society; former director, Chamber of Commerce; and former director, Pensacola Community Chest. Other memberships he held include the Order of the Cincinnati Alpha Delta Phi, Pensacola Country Club, Pensacola Yacht Club, Escambia Club and the Navy League. Also he was past state president of the Civitan Club. Mr. Blount is survived by his widow, Mrs. Roberta F. Blount of Pensacola; three sons, W. F. Blount of Pensacola; Robert F. Blount of Cincinnati, Ohio, and Dr. F. A. Blount of Winston-Salem, N. C.; two sisters, Mrs. Dowdell Brown of Atlanta, Ga., and Mrs. L. A. Craig of Washington, D. C., and five grandchildren." I cannot remember or find any record of his having been a football coach at M.I.T. He apparently entered M.I.T. in our sophomore year, after preparing at Yale, and I cannot find that he played on or coached our football team in our sophomore year. Maybe someone can remember. . . . **Frederick E. Burden**, VI, who lived all except the last few years of his life in North Attleboro, Mass., died on October 8, 1966. I find record of his attending M.I.T. in 1902 and 1903, but have no further information. . . . I am indebted to the secretary of the class of 1900 at Wellesley for sending a clipping from the Wellesley alumni magazine giving rather a complete story of **Mrs. Eliza Newkirk Rogers** who died in Philadelphia on January 5, 1966. As Eliza Newkirk she took architectural courses with us in 1903 and 1904. Later she returned to Wellesley and was an instructor in the history of architecture at Wellesley in 1915. I am quoting two bits from the obituary: "Her wonderful energy reached over a lifetime of architectural achievement as well as thirty years of teaching art and the history of architecture at Wellesley. During these crowded years she was also busy in her office in Boston designing houses for clients in New England and New Jersey, among them several members of the Wellesley faculty. And, of course, the Horton, Hallowell, Shepard quadrangle was her work. There is no space in these brief notes to measure the debt Wellesley

owes Bess. Others can tell of her work as teacher, of the students whose vague uninformed interest in art she channelled into serious study, some of them going on to satisfying careers as practicing architects." If anyone remembers her and would like to read the complete article, I'll loan it, maybe **Charlie Mayer** or **George Barrows**. One change of address, **Arthur E. Spencer**, III, is now living at 34 Elm St., Foxboro, Mass.—**Fred W. Goldthwait**, Secretary, Box 32, Center Sandwich, N.H.; **Gilbert S. Tower**, Assistant Secretary, 35 No. Main St., Cohasset, Mass.

## '06

As you read, Christmas will be just a memory—pleasant we hope. But as I write we are completely surrounded and submerged by it—just two weeks away. The cards are going and coming but so far no notes or messages, hence NO NEWS. Have you sent me a card or a note lately? —**Edward B. Rowe**, Secretary-Treasurer, 11 Cushing Road, Wellesley Hills, Mass. 02181

## '07

At the time of the death of **Andrew N. Rebori** I reported in the November '66 notes of my inability to contact Andrew's daughter and of expressing the sympathy of the class to her and other members of his family. Shortly after Thanksgiving I received a post card from a Mrs. Catharine C. Willson giving me the address of Mrs. Howard M. Donaldson, Andrew's daughter, so that I have been able to send her the sympathy of the class. Andrew had one son, Andrew P., now deceased. It seems that this son was married to Mrs. Willson's husband's daughter, by a former marriage, and that they had four children. I wrote Mrs. Willson and expressed our appreciation for the interest she took in getting this information to me. After I hear from Mrs. Donaldson, I will include any further information about Andrew in our next set of notes. . . . The Technology Review for November 1966 was delayed somewhat in publication. It was excellent, however, and carried many interesting articles. If this is a forerunner of what the new editors plan to put out, every '07 man should receive this monthly magazine (nine issues per year). A contribution of \$5.00 or more each year entitles you to receive the magazine. It is planned to include pictures in the Class Notes. So anything that you have, pertinent to 1907, send to me for possible publication. As all of our class have now passed the fourscore mark, we must expect frequent visits from the "Grim Reaper." This month is no exception. . . . **Emory G. Hukill**, VI, will be recalled by many of the class. His decease was on May 25. I received this news through the Alumni office and wrote the family early in December. . . . **Fred Paul Upton**, of Millerton, N.Y., passed away in 1965. I have written to his widow.



Fred was as an associate member. The Association also notified me of the death of **Sumner S. Peck** of Lewiston, Maine, on July 3, 1965. He also was another associate member. . . . Check your class list and see if you have changed the address of **Parker Dodge** to Brooklin, Maine, P.O. Box 77, zip 04616. In the "Happy Birthday" column in the November 1966 issue the name of **Ralph J. Karch** of Fort Myers Beach, Fla., appeared as celebrating his 80th birthday on November 4. Evidently he is the youngest man in the class instead of your Secretary. I wrote him our congratulations. . . . I wish to correct one of the paragraphs in the obituary account of **Frederick Bachman** in the November 1966 issue of the Review. I erroneously stated that the firm of Kenyon & Kenyon was in New Jersey. It is instead a New York City organization. After 1959 Fred served as Of Counsel for them. A civil engineer does not always understand legal terms. That is why we have lawyers. . . . All '07 men received from me late in December a notice about our 60th Reunion, a questionnaire to be filled out and returned and a letter and Treasurer's Report. If these are still unanswered on your desk, please mail them back today. This is the last call for the 60th roundup.—**Philip B. Walker**, Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould**, Assistant Secretary, 409 Highland Street, Newtonville, Mass.

## '08

**Gregory Dexter**, Chairman of the Admissions Committee of the American Society of Mechanical Engineers, has been elected a Fellow of the Society. Congratulations! . . . We are sorry to report the deaths of **Oscar A. Iasigi** of Barnstable, Mass., on May 1, 1966, and Mrs. **Elizabeth S. MacDonald** (nee Elizabeth Stone) of Hingham, Mass., on November 30, 1966.—**H. Leston Carter**, Secretary, 14 Roslyn Rd., Waban 68, Mass.; **Joseph W. Wattles**, Treasurer, 26 Bullard Rd., Weston, Mass.

## '09

In the May 1966 Review we included a notice from **Steve** (Joseph N.) **Stephenson**, X, that he had resigned as vice-president of National Business Publications and editor-in-chief of *Pulp and Paper Magazine of Canada*, a post which he had held since 1916 (50 years), and that he and Mrs. Stephenson were moving from Gardenvale, Quebec, to Wolfboro, N. H. Recently we received another note stating that Steve and his wife were living year-round at what had been their summer residence in Wolfboro and were enjoying life there. . . . We have received a notice from John Wiley & Sons of the publication of a new book by **Mayo D. Hersey**, *Theory and Research in Lubrication*. The publishers feel that this book will be of special interest to many M.I.T. alumni. We have already stated in these notes that Mayo is a visiting professor of engi-

neering research at Brown University. . . . We have received the following note from **Leon Healy** of Milwaukee: "Just a short note which I am enclosing with the annual Class Alumni Fund Drive. I was in the hospital last June for a minor operation but back in circulation in about three weeks and back at work in four. Am feeling fine again and still active in my work. Spend two days in Illinois and two in Wisconsin. Ruth and I then drive to our cottage on Green Bay in the northern part of the state for Friday, Saturday, and Sunday. We hope to be able to attend the 60th Reunion. We trust that you and your family are well." . . . We have received a notice from the Alumni Office of the death of **Lewis J. Holliday**, IV, at Laramie, Wyo. Our records show that he lived in Laramie since 1916, but we have no further information on his activities.—**Chester L. Dawes**, Secretary, Pierce Hall, Harvard University, Cambridge, Mass., 02138; **George E. Wallis**, Assistant Secretary, Wrenham, Mass.

## '11

**Morris Omansky** has closed his Cambridge office but is carrying on his work as expert in rubber chemistry in litigation from his home, 9 Babcock St., Brookline. He has access to a chemical laboratory when he needs it. . . . I had a letter from **D. P. Allen** who, with his wife Mary, is living for the winter in Huntington, Md. To quote him: "It is a stupid life and will be until we get back home in April." As I think all of you know, he is partially paralyzed from shocks, the first of which came over five years ago. He closed by hoping my reply to his letter would not report too many deaths. . . . I have only one to report this month: **Arthur E. Bradley** of 11 West College St., Oberlin, Ohio, who died last June. . . . I have one new address. **Roy A. Seaton** lives at 751 Leavenworth St., Manhattan, Kans. 66502. . . . If there is any classmate with whom you have lost touch but to whom you would like to write, I'd be glad to furnish the address. Write to Obie.—**Oberlin S. Clark**, Secretary, 50 Leonard Rd., North Weymouth, Mass. 02191

## '12

A letter just received from Mrs. Tuller tells of **Charles L. Tuller's** death on November 2nd at the Beaumont Hospital in Royal Oak, Mich. They had both been very well since we saw them at Harwichport in 1962, having driven to the West Coast each winter for several months. Charlie was for many years with the Ford Motor Company in Detroit working up through the various divisions to an important post at his retirement. . . . Word has just been received of the sudden death of Mrs. W. Salisbury in Minneapolis, Minn. **Willis Salisbury** is in good health and is planning to be with us next June for our 55th Reunion. . . . A letter from Mrs. Marian Clark Stewart reports the death of her father Col. **Howard Foster Clark**,

U.S. Army, retired. Howard joined the Corps of Engineers shortly after graduation. He served through both World Wars and in World War II was Commander of the 365th Engineers Regiment. Following retirement from the Army he became manager and chief engineer of the Chino Basin Municipal Water District in Ontario, Calif. He was a member of many civil engineering societies and filled many civic offices in his neighborhood. . . . **Jay Howard Cather**, who retired from Eastman Kodak Company in Rochester several years ago, reports that he and his wife are both in good health and plan to take a West Indies cruise this coming spring as they have done for several years past. They are both looking forward to seeing us all at our 55th Reunion. . . . A letter from **David J. Guy**, 3224 Morrison Street N.W., Washington, D.C., reports practically total recovery from his serious illness of several years ago. He suggests that a list of 1912 living graduates with addresses would be of interest, and I am pleased to report that as soon as the Institute publishes their complete list of graduates, which is coming out soon, we will have a 1912 section printed up for distribution to the class. . . . **Kenneth H. Barnard**, Box 74, Barnstable, Mass., who lists himself as a contractor on the Cape, reports that his son William, Harvard A.B., 1946, and Ph.D. Princeton, 1950, has recently been made director of research for the Chicopee Manufacturing Company and elected to the Board of Directors. Chicopee is the textile division of Johnson & Johnson.—**Frederick J. Shepard, Jr.**, Secretary, 31 Chestnut Street, Boston, Mass. 01945; **John Noyes**, Assistant Secretary, 3326 Shorecrest Drive, Dallas, Texas 10145

## '13

To you who celebrate Lincoln's Birthday, Valentine's Day, or Washington's Birthday, greetings. Our **Heinie Glidden** has presented a showing of watercolor paintings and original pen and ink drawings at the Thomas Public Library of Quincy, 381 Hancock Street, North Quincy, Mass. This showing was held from November 14th until December 17th. The Capens enjoyed it very much. To you, Heinie, we salute. . . . It is our unfortunate duty as bearer of sad news to report that one of our most loyal wives departed November 1st, and we quote her daughter Cynthia Pierce Trites: "My dad, **Bion L. Pierce**, has asked me to notify you of my mother's sudden passing on November 1st. She leaves three children and seven grandchildren. They both enjoyed the class reunions, and Dad is looking forward to the next which either my sister or I shall attend with him." Here again we quote, from a letter received from Edith L. Wright: "I am very saddened to tell you that **Louis E. Wright** passed away on June 26, '66. I haven't been able to bring myself to write about it. Leukemia was the cause of his death. I well remember our trip to the 50th Reunion. It was most enjoyable, and I hope you will have every success with the 55th one." Again with

saddened feelings we announce the death of **David Hilliard**, a very loyal classmate, and we quote the several press notices: "Services for David H. Hilliard, 76, of Bull's Eye Road, Ipswich, Mass., a retired federal mediation and conciliation commissioner who died at his home Friday, October 20th, after a long illness, will be held at 2 p.m. Tuesday in the Whittier Funeral Home, Ipswich. He was a member of the commission from 1942 until his retirement in 1960. He was born in Haverhill, attended Governor Dummer Academy, and was graduated from Haverhill High School and Massachusetts Institute of Technology. He served with the National Guard during the Boston police strike in 1918. During World War II he was a member of the Coast Guard Reserve and took part in numerous patrols of the Merrimack River division. He also taught navigation for the Coast Guard. He was a former state consultant to the Board of Conciliation and Arbitration. Before being named to the commission he was affiliated with the firm of Hilliard and Taber, manufacturers of women's shoes in Haverhill. The firm was founded by his father. He was also director of the Haverhill Shoe Manufacturers Association. He leaves his wife Marie and a daughter, Mrs. Marie D. Hayes of Newton, Mass."

In connection with dues bills and questionnaires which we sent out in September, we received a message from **Marion Rice Hart**: "You want my life story? Abbe Emmanuel Joseph Sieyes (1748-1836) when asked what he did during the French Revolution, replied, 'I survived.' That goes for me, too." . . . **Arthur L. Brown**, 195 Paul Street, Brookline, Mass. 02146, is sharing an apartment with his wife Emma, registered professional engineer, Massachusetts and Rhode Island, loss investigations, mostly fires and explosions. . . . **Henry W. Drew**, 3703 Ortega Boulevard, Jacksonville, Fla. 32201; wife, Sarah Ford; children: Mary Blend Osborn, Henry W., Jr., Sarah Warmath, Virginia C. Dew, Elizabeth W. Dew; also nine grandchildren; retired, vice-president of St. Joe Paper Company, vice-president of Florida National Bank of Jacksonville, president Alfred DuPont Foundation, real estate broker; still play golf, hunt and fish in season, and enjoy good health. . . . **Herbert B. Cady**, RFD #1, Mason's Island, Orchard Hill Road, Mystic, Conn. 06355; wife, Alice S.; children: Robert, M.I.T. '39, Bertha Urie, Ethel Burns, George B.; grandchildren: 15 of them from William S. Cady, 20 years, to Sharon Burns, 5 years; retired by Electric Boat Division General Dynamics Corporation in 1954 as naval architect; activities: now learning to grow old; hobbies: keeping house and household in repair. . . . **Alanzo M. Mutersbaugh**, P.O. Box 1297, Lake Charles, La. 70601; general contractor. . . . **Cedric Burgher**, 1029 Elm St., Dallas, Texas; wife, Frances; children: Cedric Burgher, Jr., Mrs. Cullen Thompson, David W. Burgher, Mrs. Robert Butts; grandchildren, 12 (7 boys and 5 girls); chairman Executive Committee, United Fidelity Life Insurance Company. . . . **George A. Richter**, wife, Edith; children: George Alvin Richter, Jr.; grand-

children: Janis Richter, Anne Richter; planning another quarter century of good life. . . . **James M. Beale**, 509 Neponset Drive, Venice, Fla. 33595; wife, Helen G.; children: James, Jr., Katharine; grandchildren: Sally Beale, Harriet, Eleanor. . . . **Manuel Font**, Box 618, Roosevelt, Puerto Rico 00929; wife, Sarah; six children; six grandchildren; one great grandchild; consulting engineer, Life Fellow A.M.S.C.E., Life Member A.I.E.E.E. . . . **Prescott V. Kelly**, 2915 Berwick Road, Birmingham, Ala. 35213; wife, Marguerite F.; children: George L. A. Kelly, Mrs. Cynthia Ann Meade; grandchildren: Cynthia Kelly Sullivan, Jos. Hardie Meade, Jr., Hardeman F. Meade, 2nd, Prescott V. Kelly, 2nd, Marguerite K. Kelly, Cynthia F. Kelly, George L. A. Kelly, Jr., William Meade; somewhat handicapped by health but doing better. . . . **William R. Mattson**, 13095 West 15th Drive, Golden, Colo. 80401; wife, Josephine D. Mattson; daughter: Janet E. Mattson; I've been retired since 1957, married Miss Josephine Davis in 1958; moved from Newton, Mass. in 1959 to Denver and bought my new home in Golden (near Denver). Since 1959 Jo and I have taken numerous trips: Hawaii, Scottsdale, Arizona; several to Boston (50th Reunion), cruise last winter, and a 5,000 mile trip through the South, California, etc. My hobbies are: a very active social life, a volunteer worker for Red Cross (was Chairman of our Jefferson County Chapter for two years), also a lot of political work. Have been a Republican Committee Chairman for my precinct for years, and at present working hard to help elect Republican candidates in Colorado this year. My health is excellent, but concerned about the stock market, trend of business, cost of living at present and for the next year or two. . . . **Ralph T. Alger**, 217 S.E. 18th Ave., Deerfield Beach, Fla. 33441; wife, Mary Louise; children: Arthur H. Alger, Mrs. Mary Alice Thompson; grandchildren: William A. Thompson, James R. Thompson, Ralph C. Thompson, Barbara Ann Thompson; retired (formerly president Alger-Rau, Inc., Cleveland, Ohio, general contractors; hobbies: gardening, amateur printing. . . . Well, my friends, keep the cards and letters coming.—**George Philip Capen**, Secretary and Treasurer, 60 Everett Street, Canton, Mass. 02021

## '14

We have a few more address changes than usual, probably the winter moves: **Louis B. Black**, Apt. 501, 49 St. Clair Ave. W., Toronto 7, Ontario, Canada 36A; **Louis W. Currier**, 815 Highland Terrace, Pitman, N.J. 08071; **Earl M. Newlin**, Janny, Battles and E. W. Clark, Inc., 1401 Walnut Street, Philadelphia, Pa. 19102; **Roy Parsell**, 609 Summer Hill Rd., Madison, Conn. 06443; **Gilbert A. Wagner**, Old Monson Rd., P.O. Box 66, Stafford, Conn. 06443; **William L. McPherrin**, 121 West 14th St., Kansas City, Mo. 64105; **Charles E. Woodlock**, Higate Apts., A-24, Watertown, Conn. . . . We have just received from Donald Fra-

ser, '28, of Pittsburgh, an informative letter about **Herbert Hall**. They have been associated in various ways since they have both lived in Pittsburgh and Don Fraser has been very active in Alumni Fund matters. We might add that Herb has been effective in increasing the share that 1914 has contributed. The jist of the information from Don is that Herb has been hospitalized several times for retinal operations and might appreciate a contact from '14ers in the area. . . . We have a short note from **Hibbard Busby** from Brevard, N.C. He says that **Rudy Zecha** paid him a visit not long ago. They went to school together. We haven't heard from Rudy for some time. Bus as usual manages to keep busy. He was just elected head of the Community Action program in the area which he says will take a lot of planning and coordinating. Yep, there's just one way to keep young. . . . The latest letter I have from **Homer Calver** is a strong impressive pitch for getting to the M.I.T. Mexican Fiesta beginning March 9, and which he has already attended on three previous occasions. You probably have printed information about this, but it is nice to know that at least one '14er by experience can give testimony. If you want more firsthand information let me know. Don't write Homer who will probably be at San Miguel for most of the winter.—**Herman A. Affel**, Secretary, Rome, Maine. Mail: RFD 2, Oakland, Maine 04963

## '15

Your ordinarily infallible class Secretary is, after all, only human. When I make a mistake, I make a big one. Is my face red? In our November column I inadvertently omitted the names of **Ben Neal** and his charming daughters, Mrs. Barbara Dearman and Mrs. Peggy Ralston, as attending Alumni Day. My head hangs low in shame. They were very much in attendance at everything all day, including the delightful finale at **Bill Smith's**. Many apologies, Ben, Barbara and Peggy, and I hope you'll forgive me. Ben has gone to work with his usual vigor on his new job as class Agent. All the best to you, Ben, to continue successfully the fine example Max set. Save April 21 for our annual class dinner at the Chemist's Club in New York. This later date should attract a much larger attendance to add to the crowd who will go over from Boston. See you there! In Boston hospitals the past few months we could have held a small reunion, but it would have been sad. Early in October **Eastie Weaver** suffered a paralytic stroke and has been in the Newton-Wellesley Hospital since. In December it was expected to move him to the Lemuel Shattuck Hospital here for therapy and rehabilitation. . . . On Thanksgiving Day **Phil Alger** entered the Massachusetts General Hospital in Boston for surgery. When I talked to him today (December 6) he was in tough shape. When it's permissible, I'll see him and report on his condition. Just when we all felt **Reggie**



Foster was making a strong comeback from his recent cardiac trouble, he had to return to the hospital. I saw him and Phil (before his surgery) at the same time. I'm sure you'll all join in wishing these good friends and classmates speedy and complete recoveries and good health again. . . . **Ed Kingsbury** wrote from Keene, N.H., to correct the impression from our November column. "Your '15 notes in the Technology Review have been of constant interest to me. I noted in your November issue, 'Kingsbury is now associated with the American Unitarian Association.' This is my son, M.I.T. 1938. I am a retired founder of the Kingsbury Machine Tool Corporation, manufacturers of single purpose high production drilling, tapping and milling machines for industry. There has been some confusion because of the fact that he omits Junior from his name." . . . **Ernie** (Marco Polo) **Loveland** keeps travelling around in that storybook far-off Orient in his elusive search for that seaweed echema spinosum. His companions are a mixture of Chinese, Hindus, Sikhas, Malaysians, English, Australians and Americans. I wonder whether we'll know Ernie when he returns here. . . . **Pop Wood** is director of the Civil Defense Unit in Peterborough, N.H. The Peterborough *Transcript* recently carried a glowing story of Pop's work in organizing a volunteer committee and securing a local headquarters in the town for their operations. Hard to keep a good man down. . . . **George C. Lawrence** died May 16, 1966, in Rochester, N.Y.—**Azel W. Mack**, Secretary, 100 Memorial Drive, Cambridge, Mass. 02142

## '16

We still have plenty of memories of the 50th Reunion to keep us going at least until the 51st next June. And we are glad to have **Steve Brophy's** report of **Van Bush's** comment on the big one eight months ago: "I certainly enjoyed myself, and I think all the members of the class did also. In fact, I think it set something of a record as a successful reunion." And we confess many of us are jogging our memories just a bit with "Now, who was that?" as we study that beautiful big group picture of '16ers and wives taken by Mel Howard at the Oyster Harbors Club on the Cape. . . . **Clint Carpenter** calls the 50th an "enjoyable and outstanding occasion which tends to substantiate the fact that the class is all that **Ralph Fletcher** said it was on the 1966 Alumni Day." Clint adds: "Shortly after returning from the Reunion we did acquire (on June 27) a grandson who incidentally bears my name. Only time will tell whether or not he will be the third M.I.T. man from this family. He hasn't made up his mind yet." . . . And **Irv McDaniel** sends us a 5-stanza poem entitled "50-Year Reunion." We'll put it on the bulletin board in June, on the '17 bulletin board maybe for it starts like this: "A class reunion's not depressing; Indeed, it's more a game of guessing Who lurks behind each 'withered mask'; Be not ashamed, if you must

ask, in order to identify almost every other guy." . . . **Art Shuey** writing from Shreveport says that after four weeks in the Colorado Mountains with three grandchildren "and their mama," he needed a vacation so he joined a planned trip to Hong Kong and Tokyo. "It was so wonderfully planned that you would have expected the name Brophy to have appeared on the program. Eight days in a 707 jet from Shreveport to Shreveport, two bars on the jet always open. I had been in Hong Kong in 1962 and the new building was remarkable—prices about the same." One day in Hong Kong was "Feast of the Autumn Moon" and Art says: "All women on the trip were frustrated and unhappy. I was lucky, for some Scottish cousins live there and I spent a pleasant day swimming in Repulse Bay with them. Then a day and a half in Tokyo and home." If you want the inside dope on the super way to take such a trip, ask Art (902 Prospect Ave., Shreveport, La.). . . . **Lee Jones**, in Elma, N.Y., liked what he called "the prefectly remarkable report of the 50th" and went on to say: "I keep busy cutting grass, picking apples, and trying to do enough pruning to have branches on the wood pile for my grandchildren to chop and burn when they come over, while you, Steve Brophy, and Ralph Fletcher find time to do a swell job of keeping the rest of us informed, and planning ahead. . . . A friend who heard that I had been back to our 50th asked me to be part of a group to organize a local chapter of the Archaeological Society. I didn't think we looked that old in the reunion pictures!" Lee says Ted Jewett is the only one in the class that he sees regularly, but he does go to two or three meetings of the Niagara Frontier M.I.T. Alumni, "which are a good mixture of ages. At the last one we were taken through the Marine Midland computer center, and more turned up than expected so each guide had quite a large group and was put to it to answer all the questions. For instance, I asked how come that after allowing for the 8 digits that identify the bank (nationwide) my checks have XXX-XXXXX-X digits, while my mother's account in a bank which is in the First Bank Stock group in Minneapolis has only XXXX-XXX digits. He said frankly that he could not account for it but was going to Minneapolis in a week or two and would ask. If there is anyone in the class of 1916 who really understands computers, maybe you could get him to explain in words that most of us could understand how the frames are set up that they apparently change from time to time in a computer, does each one store a certain type of information, who decides when one has as much as it can cope with and is it time to start another, etc., etc.? I for one would be glad to contribute a small sum toward the duplicating and distribution of such an information sheet that might update a lot of us." . . . In our earlier notes on what **Hovey Freeman** has been doing we forgot to mention that Hovey has given his fast Bass Boat to M.I.T. Apparently they are delighted with it and in November were using it for chasing the sailboats



PHOTO: MEL HOWARD

Harold Dodge, Secretary '16, and William Barrett, Class Agent '16, leading a dry run rehearsal of their 50th Reunion pageant on Alumni Day last June.

and rowing sculls around. . . . Word from **Dick Berger** in Bridgeport brought the good news that he is much better, his eyesight very much improved since his serious car accident a year ago. He says: "Although I still am not driving the car, I am taking some trips, including one to Miami Beach, and am doing some work on my avocation" (Cancer Prevention, Inc.—Secretary).

Allie and **Ted Jewett** tell of a two-weeks motor trip in September from Buffalo visiting friends in Darien and New Haven, Conn., and attending the 75th anniversary celebration of Hotchkiss School. There they saw their grandson Tony Jewett play soccer, and had the fun of taking a number of the boys out to dinner. Ted continues working at the hospital and in the bank in Buffalo, and they still spend their weekends in their country spot where they had 18 for Thanksgiving—all the children and 9 of the 11 grandchildren. Come the ice and snow on February 1st (watch that date), and off they plan to go to the Hillsboro Club at Pompano Beach for a 5-weeks stay, returning by easy stages and visiting along the way. . . . **Jack Burbank** was still playing golf at the end of September. And how about this. He played in the Osterville Men's Club Championship matches, 18 holes at Wianno and 18 holes at Oyster Harbors—gross scores only to count, total for both courses. He had an 85 and an 89 for 174 and won the tournament! Small Paul Revere bowl to keep and a 10-inch Revere bowl for one year! He asks, "How lucky can you be?" But we think he really must have it. Then he notes, "As a member of the town planning board I am faced with meetings every Monday night at 7:30 from now until the town meeting next March. This work is very much worth while. The position is elective for a 5-year term. Other classmates might find this type of interest to their liking. (Agree. We had 17 years of it, Secretary). And speaking of philosophy, Jack gave us something that he calls "good for young grandchildren," namely, "A smile is a frown turned upside down!" (Kipling). . . . What about this bit of modified activity for **Cy Guething**? He writes:

"Have put the lawn, gardens, and shrubbery away for the winter and from now until the Bahamas am taking up cooking for serious. Tested out my granddaughter this morning on New England corn fritters—pancake style. She ate 24 and gave me an 'A.'" And then Cy has a hard-hitting comment that we assume will be taken as constructive: "She was advised that the computer used by her girls' college and a boys' college had its origin at M.I.T. At a joint party she asked for a six-footer, athletic, and a good dancer. She got a 5-foot 3-inch 109-pounder, good chess player but one who had never danced. Shame on M.I.T., says she!" Cy and Gyps are all set for Harbour Island, Bahamas, starting January 11 for 7 weeks. Cy hasn't said whether he was going to offer himself as a guide this year, but one thing we know—he won't find Bob Whites calling prettily to him if he gets up for early morning walks the way he and some others do at Reunions on the Cape. He suggests: "We should have the corner stone of McCormick Hall opened up and a copy of our 50th Reunion report inserted in the crypt."

**Ralph Spengler** writes that since his wife died a year ago he has taken up residence in a nice retirement home in Cleveland and "we are well taken care of and are allowed to come and go as we please." And he has found a new interest. "I have been working here with a man who is interested in the stock market. Up until recently he was able to see. Now cataracts have limited him, so I have been reading to him and plotting his stock sheets. There is much to learn from this contact. I feel a little like the man who wrote: 'Sitting still and wishing, makes no man great, the Lord sent the fishing, you must cut the bait.'" . . . From **Charlie Lawrance** we have received a copy of the November 1966 issue of *Yankee*, with instructions to look carefully at page 100 et seq. Sure enough, the article "300th Anniversary of a House" is all about the Alexander Standish House in Duxbury and its owners, Dorothy and **Dave Patten**. In fact there's a wonderful picture of the two of them on pages 102-103, seated "in the former kitchen of the Alexander Standish House," in the midst of things quite New Englandish. Those who went on the tour of Plimouth Plantation from the Reunion last June, conducted by Dave himself, probably can visualize the background surroundings of the Pattens in this picture. But for those who missed we recommend borrowing somebody's copy of the above-mentioned November issue. In part the article by Frances A. Barton reads: "The house owned by Dorothy and David Patten on Goose Point in Duxbury is 300 years old this year. It stands on land originally assigned to Myles Standish by the Plymouth colony, and was built for Alexander Standish, his oldest son. The history of the house can be said to begin in 1584. In that year a son was born into the Standish family, in the village of Chorley, in Lancashire. The boy was christened Myles, and his name was undoubtedly entered in the parish register. The Standishes, who were landed gentry, had divided into

a Protestant and a Catholic branch. The seat of the Protestant branch was called Duxbury Hall, and it was to this division of the family that Myles Standish belonged. . . . He was the only military man in the group of English settlers who arrived in Plymouth in 1620. He was their commander until his death in 1655. During the great sickness of the winter of 1920-21 Myles remained able-bodied. In his 'History of Plimouth Plantation' Bradford wrote: ' . . . in time of most distress there was about 6 or 7 sound persons, who, to their great commendations be it spoken, spared no pains, night or day, but with abundance of toyle and hazard to their owne health, fetched them wood, made them fires, drest them meat, made their beds, washed their loathsome clothes, clothed and unclothed them; in a word, did all the homly and necessaries offices for them which dainty and quesie stomachs cannot endure to hear named; and all this willingly and cherfully. . . . ' The Courtship of Myles Standish,' in which Longfellow describes a bashful and rough military man, too unsure of himself to ask young Priscilla Mullins to marry him, is regarded by historians as pure fiction." And further, "David Patten, a veteran of two World Wars, naval officer on General MacArthur's staff, and Chief Marshall of the Duxbury Tercentenary Committee of 1937, is in a position to understand the importance of military men in times of crisis and the worth of old houses. The Pattens have renovated the house without destroying its old features and have placed it in excellent condition. For a long time Myles Standish should be able to stretch out his hand over his New World Duxbury and over the cottage built by his son." There were seven '16ers at the December class luncheon at the Chemists' Club in New York. A set of color pictures of the reunion taken by **Bob Burnap** was shown around the table and at once acclaimed as perhaps the finest set of reunion pictures yet seen. The common question—Bob, what kind of camera do you have? We heard **Walt Binger** tell of his first-time chilled-through feeling at a fox hunt on Thanksgiving morning, the 37th fox hunt season we think it was, with north winds that did blow until ears and all were just plain bitterly cold. Walt says that as a huntsman you get paid if you have a good day, but he loves to do it for nothing. Those at the luncheon were **Walt Binger**, **Art Caldwell**, **Harold Dodge**, **Jim Evans** (improved now, with the pin removed from his broken elbow), **Rudi Gruber**, **Francis Stern**, and **Peb Stone**. As of mid-December Francis was to leave for Los Angeles and Palm Springs until fishing starts to get good in the East on April 1st, and Rudi was to leave for Germany where he and a brother were to share Christmas for the first time in 54 years.

We regret to report that **Obie** (Oden Bowie) **Pyle** died on Sunday, December 4, at Rest Haven, Erdenheim, just outside Philadelphia, after a long illness. Memorial services were held in the Kirk and Nice Funeral Home in Philadelphia at 8 P.M. on December 7. **Harold Fuller**, who lives in Bryn Mawr, represented the

class at the services. A number of '16ers had been keeping in touch with Obie who deeply regreted his inability to attend the 50th last June, and was always "ears open" for any happenings of the renowned class of 1916. Just a week before his death he sent us a note expressing considerable interest in a newspaper clipping we had sent him—a story about a cherry-tree shaking device and its engineer-inventor who had an address that was obviously right next door to Obie's 508 East Valley Green Road in Flourtown, Pa. We will have more about Obie in a later issue. . . . And so we close for the time being with the reminder it won't be long now before the 51st comes along. Just save those dates—June 9-11 at Chatham Bars Inn, Chatham, Cape Cod, and June 12 for Alumni Day in Cambridge. Remember too, per Jim Evans' post card reminders, the monthly Class-of-1916 luncheons at the Chemists' Club, 52 East 41 Street, New York, right near Grand Central, the Tuesday following the first Monday of each month. Plan your schedule to include this date on your next trip to New York. And keep the news and bits of philosophy coming in—just a little, just as often as you can—to help make the 1916 column full and interesting.—**Harold F. Dodge**, Secretary, 96 Briarcliff Road, Mountain Lakes, N.J. 07046

## '17

The November issue of *Technology Review* was presumably a bit late in mailing. Anyway the Secretary's copy did not arrive until December. It certainly was well worth waiting for. So far as the class notes therein, the coverage is indeed excellent as all classes from 1895 through 1966 were included with the exception of only four. It is indeed good to see the resumption of pictures in the notes. Therefore, let's have some snapshots of general interest. As these notes were edited in early September, it is noted that your Secretary's sailing in November was most optimistic. Waiting-listing for sailings in November and December '66 and January '67 on an eight or twelve passenger freighter produced no openings, but we are accepted for November '67. Also accepted are the Truly Warners, class of '18, and two couples of previous voyages on the waiting list. . . . The M.I.T. Club of Northern Jersey in meeting on December 1st paid tribute to our late secretary, **Win McNeill**, by a standing minute of silence. Win was one of the founders of the N.J. Club, it's second president, and was active throughout. The meeting was a most instructive and fascinating demonstration of computer operation at the Hoffman La-Roche beautiful plant in Clifton. A class of '55 man was M.C., and with the use of a teletype machine submitted a problem to the G.E. computer in Valley Forge, Pa., and in 7 seconds, at the cost of less than \$2.00, came up with the answer of the amount of 1¢ compounded daily for 31 days. The total is unbelievable. When traveling in Switzerland I would suggest



purchasing a few shares of Hoffman La-Roche, transacted only on the Zurich Exchange, and know that the Institute would appreciate a gift of same. . . . **Gordon Shand** passed away November 26th and I am quoting from the *New York Times* of that date the clipping Mrs. Shand was kind enough to send me. Tubby Stout saw the notice and reported from Cape Cod. "Robert G. Shand, news managing editor 17 years, is dead at 70. Mr. Shand joined the *New York News* as a copy editor in 1923 and was the newspaper's executive editor at his retirement last July 1st. He was executive editor for 2½ years. Before that he was, successively, chief of copy desk, make-up editor, Sunday and rotogravure editor, day city editor, and managing editor. He held the managing editorship for 17 years, in which he built a reputation for his preceptive coverage of news events, his eye-catching page one headlines, his calm incisiveness in moments of general confusion and his personal involvement in the day-to-day editing of the tabloid newspaper. Under his direction the *News* won many photographic and news awards, including five Pulitzer Prizes. Far from being the flamboyant editor of screen and stage invention, Mr. Shand radiated an air of almost scholarly gentleness and seemed imperturbable. Reporters learned, however, not to mistake his composure for complaisance, for Mr. Shand was unwilling to accept any substitutes for excellence. The *News* gives this example of his passion for perfection. When he was a city editor, he'd tell a rewrite man to do a funny story on something that was only half funny, and the rewrite man would sweat and pound it out and send it to the city desk, and Shand would read it and then take it back and tell the writer to try again. If no deadline was in the offing, this sometimes would go on for hours. But when the final product emerged into print, it was invariably a gem. Mr. Shand possessed an instinct amounting to genius for writing big block letter headlines for the *News's* page one. When the Brooklyn Dodgers defeated the New York Yankees in 1955 to win their first World Series, he struck off what many newspaper men considered one of his finest headlines. It was, "Who's A Bum!" It accompanied a drawing of a rather repulsive-looking, exultant tramp and it stemmed from one of the nicknames for the Dodgers, the Bums. The headline is said to have increased that day's circulation of the *News* by 100,000 copies. He again exhibited his capacity for conciseness on March 1st, 1962. That day an airliner crashed here killing 95 persons; a major bus strike started; and the city welcomed John Glen, the astronaut. The headline read "Death, Triumph & A Bus Strike." Robert Gordon Shand was born in Lynn, Mass., May 12th, 1896, the son of a ship builder. He was graduated in 1917 from the Massachusetts Institute of Technology, where he studied naval architecture. From M.I.T. he went to the United States Naval Academy and served as a lieutenant in the Navy in World War I. At the war's end he took a job with the *Washington Herald* and was re-write man until

1923. On his retirement F. M. Flynn, President and Publisher of the *News*, and R. W. Clarke, it's Editor, joined in a tribute to Mr. Shand. 'Many notable examples of newspaper enterprise, both in news and picture coverage, have been achieved under his direction. He has contributed greatly to the reputation which the *News* has for being one of the best edited papers in the country.' For relaxation he painted pictures and enjoyed Cape Cod life at his summer home in East Sandwich, Mass.

**Fernald E. Hulse** died April 25th, 1966. The 30th Year Book does not give any history, however he has been on the New York luncheon mailing list for years. As noted in the January Review, his address was 99 Highland Avenue, Somerville, Mass. . . . Seventeeners on the move include: **W. Joseph Littlefield**, Miami, Fla., 6080 S.W. 104th St. 33156; **Alden D. Nute**, P.O. Box 1231, Providence, R.I. 02091; **G. Dana Spear**, 29341 Thornhill Dr., Sun City, Calif. 92381; **David E. Waite**, RFD 1, Quonochontaug, Bradford, R.I. 02808; **Mrs. Basil S. Warren**, 30 Cherry St., Bridgewater, Mass. 02324; **Leslie B. White**, 2 Hill St., Eastondale, Mass. 02335. How about some news from these newly moved! . . . **Ken Bell** writing from the Belfry, Mirror Lake, N.H. 03853, "My Quiet life gets punctuated; I am to go to Paraguay and probably Mexico City for 10 days right after Thanksgiving for Arthur D. Little Company. Then we sail on December 20th on the SS Independence for Palma, Mallorca, with trips ashore at Maderia, Casa Blanca, Gibraltar, Naples, Cannes, and Barcelona, landing on Palma on January 3rd. We expect to stay there until March 22nd and return on the SS Constitution from Barcelona, with shore trips again and home about April 3rd." . . . From **Ray Stevens** is a note that **Tom Meloy** was in Boston, and while there he and Mrs. Meloy had dinner with Sue and **John Lunn** and Dr. and Mrs. Killian. . . . Also in Boston in November was **Ed Aldrin, Sr.**, for the American Institute of Aeronautics and Astronautics. Ed on December 1st went to Dayton, Ohio, to receive formal recognition as a founder of the Air Force Institute of Technology (A.F.I.T.). He started it, using top Air Force officers as faculty, in 1919. . . . Anyone who has to remain over the weekend in Boston should attend the Old South Church at Copley Square on Sunday morning. He will have the pleasure of renewing old memories as well as contributing to the Church when our able assistant secretary comes by with the plate. Your Secretary recommends this as a good investment as Jeannette and Stan know some very good eating places nearby.

Ray Stevens reports that the effort of the 50-Year Gift Committee, and many others who helped to have the main solicitation completed by the end of the year, has succeeded in recording the action or the intent of the great majority of the class. Those who have not either given, recorded a pledge, or deferred gift, or their plan or intent, will be approached in the hope that the present reasonably high percentage of participa-

tion can be increased even if modest or for that matter only token amounts are recorded. Ray thinks it out of order to report figures until accurate totals can later be compiled from the records at M.I.T., but says that while the grand total may not match that reported by 1916, 1917 will not need to apologize. We can now concentrate on a record attendance and a satisfying time at the climactic 50th Reunion." My ability to send in notes come primarily from the excuse the Gift Drive has given me to see and talk with so many, but that will stop soon." The class secretaries have greatly appreciated this excellent cooperation and flow or news and sure would like it to continue from more of you.

Doctor **Stanley M. Lane** it is! At a convocation at the Gordon College and Divinity School, Wenham, Mass., the award of Doctor of Laws was conferred on him this December 7th. The impressive ceremony was held in the commodious Lane Student Center which is a memorial to Stan's father and mother. Both Stan and his father have served Gordon as trustees for many years. On December 13th the Trustees and New England Baptist Hospital Family honored Stanley Lane and his wife Helen in recognition of their long and dedicated service to the hospital. It was a memorable, inspiring and lovely occasion. More than 350 people enjoyed a delicious dinner held in the Dorothy Quincy Suite. This was followed by an elaborate program in the John Hancock Hall. The stage settings, replicas of the hospital front and the chapel, made striking backgrounds for the 70-voice glee club of the hospital joined, in some numbers, by the M.I.T. glee club. Stan has served the New England Baptist Hospital for 29 years as trustee, board chairman and as president for the past nine years, an office he has just relinquished. He continues, though, in the newly-created office of honorary chairman of the board. Space does not permit even the mentioning of the numberless services, help and benefactions which both Stanley and Helen have rendered together and individually to the hospital, the nurses and patients. The Al Lunn, Ray Stevens and Stan Dunnings were happy to be among the guests. Besides his devotion to the hospital Stan has found time to be president of Lane Brothers Company, shoe manufacturers, and be active in church and civic enterprises.

Here is a good letter from **Osgood Holt**. "I did have such a grand time when I last met some of the gang at the 25th Reunion at the Griswold at Groton Long Point, Conn. Since then my only contacts with 1917 have been through the choice tidbits in the Technology Review. I retired from DuPont in 1960 after 28 years in different places. Many years were spent in the Grasselli Chemical Department as chief standards engineer in charge of installing incentive wage plans, methods studies and job and position evaluation plans. The last eight years were at the Savannah River Plant in charge of all evaluation work at this large hydrogen bomb operations. After retirement my wife and I went West to be near our daughter and three grandchildren in

Glendora, Calif. After three years of loafing and much golf, I decided to go back to school and learn real estate selling. Been at it for four years now and love the many challenges that the work presents. [Notice another '17er, **Al Litchfield**, did the same per the November '66 Review.] I do hope to make the 50th Reunion in '67. I will probably fly East alone, as the trip by auto is too monotonous and tiring to still be able to enjoy ourselves." . . . As we meet our deadline Ray Stevens tells of a call on **Ray Blanchard** who is coming along well and able to attend his two bank meetings.—**C. Dix Proctor**, Secretary, P.O. Box 336, Lincoln Park, N.J. 07035; **Stanley C. Dunning**, Assistant Secretary, 1572 Mass. Ave., Cambridge 02138

## '18

Last month our newscast had a north and south direction. This month it turns west. The sharper contours of life are not always illuminated where the sun leaps in with golden lights. From 240 North Porter Ave., Waukesha, Wis., comes a candle lit letter which started a pleasant correspondence some of you may want to join. **Arthur Pope** says, "I was going to write you two months ago, but as time ambled along, I first decided there was too much to tell. Then it occurred to me that perhaps I owed a word to my classmates. Eleven years ago I remarried. This gave me a step-son who is twenty-three years old, and a real one now ten. He has been the joy of my later years. Nine years ago I was hit by a stroke which completely changed my life. It left me with a partially paralyzed right side and deprived me of my hearing. In nine years I have not been able to work. Do you realize what that does to a man? Still, my life seems good. We live in a small city house, and in summer go three hundred miles north to our cabin in the woods. You can imagine all that might pour out of me if I were to start telling about my life. Let me say that I do enjoy the Technology Review. I note that your address is Thorndike Pond. You must have some interesting stories about that." He not only got some stories, he got a detailed map too. Any of you retired gentry who have time to play with cooing doves will find Arthur an imaginative pen pal. Know any better way to spend an hour of a winter's evening? . . . From all the way west comes what I think is the first communication from **Henry Stephens** since the "Bucentaur" crossed the Charles River in tow of a police launch. "Last spring we took off on a two-month vacation in the Hawaiian Islands. We even bought a condominium apartment on the 14th floor of Seaside Towers at Waikiki where we expect to spend many future vacations. In between our sojourns the apartment is rented most of the time at \$300 a month, which more than covers expenses. I am the first employee of T.R.W. Systems to be continued on the regular payroll after passing age 70. I am a member of the technical staff engaged in the design of space-

craft, propulsion units and ground supporting equipment for space craft. Much of my work is conceptual design which I find so fascinating. I will probably continue actively for another ten years or more. I have two red-headed sons and a red-headed wife. One of my granddaughters has red hair—and when I last saw you, you had red hair. [Allegation denied, but I did have an auburn-haired mother and do have a red-headed grandson.] My oldest son, Jim, is in charge of the big space simulator lab at the jet propulsion laboratory of California Institute of Technology. He seems to be doing very well indeed in his profession. Son Tim is assistant superintendent of schools at Garden Grove, Calif. Being dyed-in-the-wool conservatives, we were elated at Reagan's election to the governorship of California, as well as the improvement in Republican standing nationally. My brother-in-law, Ernest Henderson, has an estate in Dublin, N.H., which is only a few miles from Jaffrey. I shall plan to look you up next time I visit New Hampshire. Let me hear from you again." . . . There was a time, when the brethren were busily active in professional achievement, that the newspapers furnished me with much ink for my pen. Now, when so many of us are looking to the past with gratitude and to the future with courage, the newspaper clippings are more likely to round out the last contours of the careers they report. **Earle Horton** of Mansfield, Mass., has written his last letter. No date given. . . . **John Janson** of Lawrence, Mass., died on October 28th. . . . **Lester Beal**, of Portland, Maine, was reported by Professor Babcock as finding the answer to what Robert Browning called "the grand perhaps" on November 18th. Take a small moment with big implications and write a note to Arthur Pope.—**F. Alexander Magoun**, Secretary, Jaffrey, N.H. 03452

## '19

A card from **Louis Brown** says: "Having reached the good old age of seven zero, the three score and ten of legend, I have been searching for the rocking chair of which I have heard. But that seems to be a myth. I am at that age, but no one has volunteered to provide the rocking chair so I am still doing 40 to 50 hours per week either consulting or just holding my client's hand. It seems that no one of my architect friends likes to compile specifications, and being possessed of a huge file and a fair memory I get the assignments for the short story." . . . **Fred Hewes** is enjoying retired life in Los Altos, Calif. He says that in the nearly 20 years he has lived there it has changed from a rural, orchard community to an electronic, aerospace urban sprawl. He hears regularly from **Ed Pickop**, **Roger Hall**, **Ted Saunders** and **Henry Wilson**, and plans to attend our 50th reunion. . . . **Dick Holmgren** writes that, having resigned his former position, he has opened a consulting engineering office which is keeping him busy. He enjoys

trailing, with a caravan trip to Guatemala City last Spring. He is planning a trip to Nice for Rotary Convention in May 1967. His children are married, and he and Virginia have 5 grandchildren. . . . A letter from **Don Way** says that he has had a pretty good summer. He announces that **Dean Webster** has been appointed as class representative for 1919 to the Alumni Council. He will replace **George McCreery** who passed away in October. . . . We have received word of the death of **George Halkiopulos**, of Athens, Greece, in March 1965, and of **John F. Lavagnino**, of San Francisco, in November 1965. New address: **Edward G. Moody**, R.F.D. #2, Nashua, N.H. 03060. . . . Mail to the following classmates has been returned. If anyone has information of their whereabouts, please send in this information: **Maximillian Untersee**, **Benjamin M. Hooper**, **Miss Marion Daniels** and **Russell J. Widdowson**. . . . **Paul Sheeline** tells me that gifts have been coming in toward our 50-year fund, and it sounds as though our class should do all right by 1969. Any contributions to the Alumni Fund this year applies also to our 50-year fund.—**Eugene R. Smoley**, Secretary, 30 School Lane, Scarsdale, N.J. 10583

## '20

The death of **Frank Owen** was reported in the Boston papers, date October 11. Frank, a noted architect, participated in the restoration of Colonial Williamsburg. He served with distinction in both World Wars, was a colonel in the Army Air Corps in World War II and was awarded the Air Medal, the Bronze Star and the Purple Heart. He had lived in Weston and Concord, Mass. . . . Among those we have not had the pleasure of hearing from the quite some time are the following, whose present whereabouts are turned up by the diligent compilers of the forthcoming Alumni Register: **John Perkins** of Wayne, Maine; **Henry Nash** of Sarasota, Fla.; **George Hanson** of Ottawa, Ontario; **Harmon Deal** of Indianapolis; **Larry Hitchcock** of Buffalo; **Herman Marrow** of Brighton, Mass. I believe I may have mentioned previously that "**Skeetz**" **Brown** returned to Texas, address 1800 No. Staton St., El Paso. . . . **Perk Bugbee** was in the local lime-light recently when he appeared for an hour and a half on a Boston radio program during which he demonstrated his vast knowledge of home and industry fire prevention by answering any and all questions on the subject put to him by telephone. Report from the radio station was that it was one of their most constructive and successful listener participation programs. . . . Heartwarming assurance that ye olde Secretary has not been totally forgotten has come in the form of early Christmas cards from **Lucy** and **Jim Gibson** now happily snuggled down for the winter in Sarasota, address 420 Golden Gate Park; from **Betty** and **Norrie Abbott** who are resting up at home in Providence between trips, for their '67 travel plans promise to be as



extensive as those of '66; from Mary and **Buck Clark** with whom we presumably shall have celebrated New Year's at our usual haunt, Steele Hill Inn, Laconia, N.H.; from Rose and **Bud Cofren** at their Winter Haven haven in Florida; from Pat and **Buzz Burroughs** of Topsfield, Mass., who are no doubt as vigorously engaged in winter sports as they were on the golf links all summer and fall; and from **Chuck Reed** from his beautiful home in Lakewood, Ohio, where he, too, has paused from his extensive travels which recently took him to Barbados, Young Island—St. Vincent, St. Lucia and Antigua. More power to them all, and a healthful, happy 1967 to you!—**Harold Bugbee**, Secretary, 21 Everell Road, Winchester, Mass.

## '21

Last call for the special interim reunion marking the 50th birthday of the class of 1921! On March 9-11 next, we will have a joint celebration with the M.I.T. Club of Mexico at their 19th Annual Fiesta. If you have just now decided to attend, contact both the Club in Mexico and **Raymond A. St. Laurent**, President of the Class of '21—at once! If you and your wife were not able to attend our previous interim reunions in Cuba and Mexico, you will certainly want to combine the pleasure of winter travel to a warmer climate with the sheer enjoyment of socializing with old and new M.I.T. friends. No attempt has been made to organize this reunion as a packaged trip, and you are free to fill in your time before, during and after the Club's scheduled program in Mexico City with tours around the city, in the immediate area or by car, bus and plane to more distant portions of Mexico. Although some aid and counsel is to be obtained from the members of the Club, most of our group have so far planned their own itineraries with classmates or with travel agencies of their own selection. Since next month will be a busy time in Mexico City, in view of large convention groups and the heavy winter traffic from colder areas, we have been advised to make travel and hotel reservations promptly and not to wait until all details have been settled on local travel, much of which we are told can be arranged after arrival. So, if there is any remote possibility that you can attend, take the necessary steps now before it is too late. Hope to see you there! . . . Honors in recognition of outstanding performance are regularly showered upon members of the class of '21. **Roderick K. Eskew**, Box 205, Spring House, Pa. 19477, was elected to receive the Babcock-Hart Award from the Nutrition Foundation and the Institute Of Food Technologists. The citation praises Rod's "developments in the field of dehydration as the basis of several processes which are in industrial production today to make available for public nutrition a wide variety of high-quality dried fruits and vegetables." The award, comprising \$1000 and an engraved plaque, was presented at the annual meeting of the

Institute of Food Technologists and constitutes one of many public acknowledgments of Rod's unique applications of chemical engineering fundamentals to food processing development. For more than 25 years he has been the chief of the Engineering and Development Laboratory, Eastern Utilization Research and Development Division of the Agricultural Research Service of the U.S. Department of Agriculture, headquartered at 600 East Mermaid Lane, Philadelphia, Pa. 19118. He has been associated with the development of potato flakes, fruit juice concentrates and powders and the recent explosive-puffing process, enabling eating of dehydrated fruit and vegetables after a few minutes of simmering. Rod was a co-recipient in 1959 of the Food Technology Industrial Award of the Institute of Food Technologists for developing potato flakes. In 1964 the Research and Development Associates of the U.S. Army Laboratories in Natick, Mass., presented him with the Rohland A. Isker Award for his contributions to dehydration and juice processing which have application to military rations. He has been honored three times by the Department of Agriculture. Twice his recognition came as the head of teams which developed the first practical process for recovery and concentration of volatile fruit flavors and which produced new products based on that process. On another occasion he was singled out individually to be honored for his "outstanding initiative and leadership in the origination and development of new processes and products which resulted in increased utilization of agricultural commodities." Rod has some 90 publications and patents and has delivered papers to scientific meetings here and in Canada, England and Germany. He is a native of Charleston, W.Va., who attended high school there and came to Technology in our freshman year after having attended the University of Arizona. He obtained his bachelor's degree with us in Course X and then the master's degree in Course X-A. He was the assistant chief chemist of Tubize Chatillon Corporation, Rome, Ga., and a technical sales representative for E. I. duPont de Nemours & Company and Hercules Powder Company before joining the U.S.D.A. laboratory in 1940. Rod has three children, a married daughter, Mrs. Richard Meyer, of McLean, Va.; two sons, Bruce, at Hampden-Sydney College, and John, who attends Penn Charter School. Rod and Milena have a countryside home, "Roseburn," where they indulge in their various hobbies of horseback riding, genealogy, photography and rose gardening. Congratulations, Rod, from all of us.

**John W. Barriger**, 3d, has been elected a director of the M.I.T. Club of Chicago. John is the subject of a long feature article in the Boston *Globe* entitled, "A Pro Looks at Railroads," in which he is quoted as having viewed the I.C.C. ruling on the Pennsylvania-New York Central merger as a forerunner of more such important rulings that will lead to other mergers and eventually to the "super-railroads" which he has long advocated. The *Railway Age* magazine recently pub-

## Deceased

**RUSSELL H. GLOVER**, '01, August 31  
**GEORGE E. T. EAGAR**, '02, December 13  
**KENNETH C. GRANT**, '02, December 12  
**CARL T. BILYEA**, '03, January 20, 1966  
**FERNANDO M. BLOUNT**, '05, November 26\*  
**MRS. ELIZA N. ROGERS**, '05, January 5, 1966\*  
**ARTHUR G. BRUCE**, '06, August 1  
**WALTER M. RUBY**, '12, January 8, 1966  
**CHARLES L. TULLER**, '12, November 2\*  
**GEORGE W. DUNCAN**, '13, September 22  
**LEONARD A. WOOD**, '13, 1965  
**LOUISE E. WRIGHT**, '13, June 26\*  
**GREVILLE HASLAM**, '15, December 22  
**CARL H. HOLMBERG**, '16, December 15  
**ODEN B. PYLE, JR.**, '16, December 4\*  
**R. GORDON SHAND**, '17, November 26\*  
**ROBERT V. KLEINSCHMIDT**, '18, November 16  
**ALBERT B. GREENE**, '20, November 9  
**GAVIN R. TAYLOR**, '20, August 12, 1965  
**GORDON A. CUSHMAN**, '22, March 23, 1965  
**MINOT R. EDWARDS**, '22, December 20  
**HOWELL C. FISH**, '22, November 22  
**CHRIS DE LOS REYES**, '24  
**JAMES D. TAYLOR**, '24, November 22  
**MISS FRANCIS S. HOPKINS**, '25, August 30  
**GEORGE F. JOURDAN**, '25, October 16  
**EDGAR M. SINAUER**, '26, March 28  
**HECTOR A. MOINEAU**, '27, December 22  
**THOMAS S. BACON**, '28, December 16  
**WAYNE E. WILSON**, '28, June 8, 1965  
**NOLAN M. KINDELL**, '29, October  
**CARL SCHULZE**, '30, March 19  
**PAUL C. WIRTZ**, '31, November 23  
**RODNEY D. CHIPP**, '33, December 27  
**FABIAN L. ROUKE**, '37, April 28, 1965  
**GEOFFREY M. MARTIN**, '38, March  
**A. ROBERT GIRARDI**, '39, November 19  
**RALPH C. SWANN**, '41, January 4  
**HENRY E. McLAUGHLIN**, '42, March 2, 1965  
**JAMES L. STOCKARD**, '52, December 9  
**WILLIAM A. SCALES**, '55  
**LEONARD D. PRESSMAN**, '65, November\*

\*Further information in Class Notes.

lished an article on John's rehabilitation of the Katy (Missouri-Kansas-Texas Railroad) which gives remarkable facts on what he has accomplished since he became president of the road in March 1965 after mandatory retirement from the presidency of the Pittsburgh and Lake Erie. His five-year program that started in June 1965 has already eliminated all "slow orders" between Kansas City and Dallas-Ft. Worth, raising current freight train speeds to 55 M.P.H., on the way to the ultimate of 70 M.P.H. This has resulted from a monumental track program for replacement of ties, new ballast and heavier rails. Interestingly, the recovery of salable waste material along the right of way has more than paid for its pickup. The Katy is continuing to rebuild eight to ten miles of its 2900-mile roadbed every day, paralleling the work also going on in erecting new buildings and acquiring new rolling stock. . . . **John T. Rule** has retired from the faculty of the Mechanical Engineering Department of M.I.T. as Professor of Engineering Graphics, Emeritus. He had headed the course in graphics since 1936 and had

also been Dean of Students. Our good wishes go to Jack at his new home at 250 East Alameda St., Santa Fe, N.M. 87501. . . . **Edwin R. Clark**, Superintendent of Gas Production, Lynn Gas Company, reports a new home address at 87 Green St., Marblehead, Mass. 01945. We are looking forward to receipt of questionnaires from both Jack and Ed. . . . **Anne and George Schnitzler** have made the usual trip from Chestnut Hill, Mass., to their winter home at 1932 N. Michigan Ave., Miami Beach, Fla. 33139. . . . **Bertha and Bob Cook** have similarly left their summer home in Canandaigua, N.Y., for the warmth to be found at 633 Royal Plaza, Ft. Lauderdale, Fla. 33301. . . . **Gustav Fredrickson** gives a new business address as Box 68, Granby, Conn. 06035, but didn't return his questionnaire to tell us whether or not he has severed his former connection as development engineer with Superior Electric Company in Bristol, Conn. . . . **Mahlon A. Hartley**, a partner in M. A. Hartley and Company, can now be reached via P.O. Box 1285, Staunton, Va. 24401, but the absence of his questionnaire prevents listing any further information on his current activities. . . . **A. Cameron Hayden** has a new retirement home and now receives his mail at Box 42, Exeter, N.H. 03833. . . . A correction to last month's listing changes the retirement home address of **Myer Weisman** to 701 S. St. Andrews Pl., Los Angeles, Calif. 90005. Still no questionnaire from the former division engineer of the New York City Department of Water Supply, Gas and Electricity! . . . **Samuel H. Miller**, Dean of the Harvard Divinity School, told a Harvard alumni audience in Washington, D.C., that theological education in this country is in need of "large scale housecleaning." He advised reform towards fewer schools, more strategic concentration of resources, radical changes in teaching and a far higher demand—both in society and in the church—for excellence in professional religious work." He pointed out that, while \$5.5 billion or 49 per cent of all U.S. philanthropy in 1965 went to activities connected with religion, only 4 per cent of it was spent for the training of competent leadership. A heartening trend may result from the report in the November issue of the Review that former President Jay Stratton, '23, of M.I.T. and Harvard President Nathan M. Pusey had officiated at the formation of a new M.I.T. Alumni Club at Harvard and also in the modification of a Technology seal to read "Mens, Veritas et Manus." . . . Addenda to the 45th Reunion report: **Roderic L. Bent**, '19, flew his own plane down from Gardner, Mass., to the Groton Airport near the Griswold Hotel to have lunch with Ruth and **Irv Jakobson**—but they had left that morning for a day at Mystic Seaport. Maxine and your Secretary enjoyed lunch with Rod and Laurie Kurth, since Chick was out on the golf course. It developed that Rod knew Laurie's family and a long discussion ensued until Rod had to leave to go back to his daily business routine at S. Bent and Bros., Inc., despite the fact that his two sons—each with M.I.T. training—run the business. Came the morrow, Rod was

back in Groton and did get together with Ruth and Jake before taking off again for his business. Speaking of Jake, announcement has been made of the launching last December at the Jakobson Shipyard, Inc., in Oyster Bay, N.Y., of the U.S. Coast and Geodetic Survey ship, the *Heck*, which is the second of two new wire-drag survey ships built by Irv at his yard. The vessel is named for the late Capt. Nicholas H. Heck of the U.S. Coast and Geodetic Survey. The sister ship, the *U.S.C. & G.S.S. Rude*, also named for a former captain in the service, was launched last August. Your Secretary missed the opportunity for a luncheon meeting with Jake, Ray St. Laurent and **Sumner Hayward** at the new headquarters of the M.I.T. Alumni Center in New York, at which further plans and arrangements were made for our 50-year gift to the Institute—comprising the '21 contributions and deferred giving during the five years from last July to the end of June in 1971. Regarding the 50th birthday anniversary reunion of the Class of '21 to be held next month—March 9, 10 and 11—at the Fiesta of the M.I.T. Club of Mexico City, the lead time of more than two months between the moment these words are written and the instant the printed page is in your hands makes up-to-date pronouncements and last-minute guidance virtually impossible. We repeat the advice in last month's issue: contact Class President Raymond A. St. Laurent, 47 Gerard St., Manchester, Conn. 06040, telephone 203 643-6056, and also the Secretary-Treasurer of the M.I.T. Club of Mexico, Armando Santacruz B., '54, Reforma 116-804, Mexico 6, D.F., Mexico, regarding your attendance. At this early December date, the letters and phone calls of various classmates to your Secretary indicate we are fairly certain to exceed the '21 attendance of thirty at the Fiesta in March, 1960. Listed last month were the names of twelve couples who have indicated their intention of going. Added to that list at this time are: Olive and **Oliver Bardes**, Billie and **Tom Bartram**, Helen and **Ed Farrand**, Anne and **Mel Jenney**, Dottie and Wayne Keith (guests of Helen and **Mich Bawden**), Betty and **Dug Jackson**, Kim and **Don Morse**, Marty and **Bill Ready**, Lovina and **Ted Steffian**, Winifred and **Royal Wood**. It is expected that Maria Helena and **Vivi Valdés** and Maria Luisa and **Manuel Sandoval Vallarta** of Mexico City will also attend the festivities. **Joe Morrell** and **Jim Parsons** have just written to Ray that there is a possibility they may attend, making the probable total '21 attendance close to 50 at this time. Come on down and join the gang! We acknowledge with sincere thanks most helpful letters from **Conchita Lobdell**, Executive Vice-president of the Club in Mexico, and from **Manuel Sandoval Vallarta** of Mexico's Nuclear Energy Commission.

Complete with helpful questionnaire is a welcome letter from **Thomas W. Bartram**, retired research chemist of the Nitro, W.Va., research laboratory of Monsanto Company. Writing from his home at 1084 Highland Dr., St. Albans, W.Va. 25177, Tom says: "The class of '21 news in the Technology Review is excellent. You are surely doing a fine service for your class-

mates! For several years **Mildred (Billie)** and I have been hearing the glowing accounts of the 'M.I.T. Fiestas' in Mexico. **Nish Cornish**, '24, gave us a special invitation at an A.C.S. meeting years ago. Now we wish to make it a reality. Please put us on the list of applicants and keep us posted. After a Christmas in Ramsey, N.J., with my son, his wife and two high school grandsons this year, we shall be leaving in mid-January for a month in Florida at Indian Rocks Beach. We had been planning a trip to northern Ireland later in the spring but now are intrigued by the Mexican idea. Five years ago I retired, at 65, from Monsanto. As you remember, I am still active with the Boy Scouts of America on council and regional level. Lately I have taken over the duties of president of an American Field Service local group. The Boston and Cambridge brethren should know that Mrs. **Norman Beecher** of Concord, Mass., who has led the League of Women Voters of Massachusetts in putting over the much-needed Civil Service reforms, is my daughter, **Nancy**. Her husband is M.I.T. '44. She is a trustee of Wellesley College and has four children." Thanks, Tom. See you in Mexico! . . . On the heels of Tom's letter came another welcome message, this one from **Colonel William C. Ready**, U.S.A. retired, 1904 Flora Rd., Clearwater, Fla., 33515, in which Bill says: "Greetings and thanks for a wonderful 45th Reunion. We are seriously considering going to Mexico and will let you know. Regards from Marty and Bill." Good news, Marty and Bill! . . . **Philip H. Hatch**, 70 Gibson St., North East, Pa. 16428, writes, in part: "This will be just a note to say that I am back in the United States after a most interesting year in Brazil on a railway consulting job for Coverdale and Colpitts. With best wishes of the Season and kind regards." Phil retired from the Long Island Railroad as chief mechanical officer. . . . **Oliver A. Mills** gives a new address at 184 W. 8th St., South Boston, Mass. 02127, without returning the questionnaire in explanation. . . . **Charles W. Richards** retired in 1965 as mill manager for the International Paper Company. Dick and Barbara make their home at 2 Lanvale Rd., York Haven, Pa. 17370. They have a married son, **Charles W.**, 3d, and two grandchildren. . . . **Ralph M. Shaw, Jr.**, President of Pedrick Tool and Machine Company, 3640 N. Lawrence St., Philadelphia, Pa. 19140, has maintained his record of many year's standing as an eminent contributor to these columns. Shortly after the reunion last June, **Rufe** wrote, in part: "We had a lovely time at the reunion and I am sorry indeed that we were unable to go to Cambridge—but I had to go to Springfield and keep the wolf of want from the threshold. I had a very successful time, and it looks as if I sold another machine." Rufe sent us several batches of most attractive postage stamps for our collection, a set of color enlargements of reunion snapshots to be distributed to members of the class and then he had a long, written discussion of public utilities with **Allen Addicks**! In the early fall Rufe wrote from Spruce Tree Lodge, Park Center, Mesa Verde National Park in



Colorado and said, in part: "After a hectic though enjoyable summer, Madeline and I decided we needed a vacation. Accordingly, we hopped off for Denver, chartered a Hertz car and decided to spend Labor Day in Mesa Verde National Park. What we are doing is to 'Discover America.' This is my fourth visit here but it is still delightful. We journeyed via Royal Gorge, the highest bridge in the U.S.—1053 feet. We saw the Black Canyon of the Gunnison, a national monument, about 1300 feet wide and 2000 feet deep. The access roads are greatly improved. We traveled over the Million Dollar Highway from Montrose to Durango. This is the most gorgeous road I have ever seen in the whole world. The uranium for the Manhattan Project came from a mine near Ouray on this road. The great Durango mine is located here. The owner was originally a farmer and at one time the bank was foreclosing his mortgage. He gave a hobo a meal and the hobo asked if he knew what his house was made of. "Rock I picked off my farm, worse luck; there is more rock than sod." "Wrong," said the hobo, "it is telluride ore, the richest gold-bearing ore in the world." As a result the farmer quit farming and became a miner. Later, they smelted the slag heap for silver, then re-smelted it for platinum. Then they did it again for lead and now they are re-smelting it for uranium. Of course, tellurium is used in television tubes, too. Mesa Verde is the home of the cliff dwellers. We took all the trips. The crowds are large for so remote a place. But the people are nice as is usually the case when a place is hard to reach. Madeline and I are both well. We'll see you some time. Our love to Maxine." Thanks, Rufe, for all the letters and the enclosures. . . . **Ray D. Cooper**, General Manager, writes a grand letter on the letterhead of the Produce Terminal Corporation, 304 Exchange Bldg., Union Stock Yards, Chicago, Ill. 60609. He says, in part: "Vina and I were delighted to receive your letter. You are most deserving of what our class of '21 did for you at Groton, Conn. Didn't we have a glorious time! I greatly appreciate your endeavors to have my name corrected in the M.I.T. Alumni Register. The Chicago M.I.T. Club has already made this correction in our new directory. It was very kind of you to invite us to Brielle on our way to Long Island. We might just do that some time. If at any time you and Maxine are in Chicago, we would be delighted to have you visit us. Perhaps we could tempt you to try one of our special stock yard steaks. My thanks again and best personal regards." We appreciate your kindness, Vina and Ray. Guess we'll get together over tequila in Mexico City before you get to Brielle or we reach Chicago! . . . We saw **Joe Wenick** at the December meeting of the M.I.T. Club of Northern New Jersey; he reported he is now actively engaged in consulting work. Joe retired in 1963 as chief engineer of Lightolier, Inc. . . . We have started to enjoy the use of our tape recorder for '21 affairs. Discussed Mexico tours and various personal matters in an exchange of tapes with Maida and **Ed Dubé** and find the medium to be much more exciting than the use of letters. It's effective

and just falls short of a face-to-face meeting. If we haven't printed it here before, the Dubés now have ten grandsons and two granddaughters, with the arrival of a son to Caroline, a son to Paul and a daughter to Anne Louise. We have had considerable help from Maida and Ed regarding their past experiences in Mexico and appreciate their time and effort in preparing the story so thoroughly. By the way, if you have a tape recorder, send us your news by that means if you wish to forego the drudgery of writing—our machine is a four-track monaural type and will operate with any of the three standard speeds and reel sizes.

It is with deep personal sadness that we express our sympathy to Mrs. Winfield I. McNeill and to the class of 1917 on the passing of a devoted husband and father and a most capable class Secretary. We had had the privilege and pleasure of working closely with Win for a number of years in organizing and the early administration of the M.I.T. Club of Northern New Jersey.

We must also sorrowfully record the passing on August 25, 1966, of **Ernest Mitchell Norberg**, 5 Longmeadow Road, Dover, N.H. 03820. We extend to his family sincere condolence on behalf of the entire class. A native of New Sweden, Maine, where he was born on July 3, 1898, he joined us in the freshman year and transferred to Northeastern University in 1919 where he was graduated as a civil engineer. During World War I he was a private in the S.A.T.C. at Technology. In World War II, he saw extensive service overseas in engineering and military government and retired from the U.S. Air Force with the rank of major. He had been associated with Arute Brothers of New Britain, Conn., for more than 30 years. He is survived by his wife, the former Katherine C. Morrison; a son, Capt. Michael E. Norberg, U.S.A.F.; a brother, Herbert C. Norberg of Winthrop, Me.; a sister, Mrs. Selma Randolph of Cincinnati, Ohio; and a grandson, Eric M. Norberg of Belleville, Ill. We are indebted to Mrs. Norberg for aid in preparing these notes.

Reminders: 50th birthday party in Mexico City, March 9-11, 1967; Alumni Day on campus in Cambridge, June 12, 1967; return that IBM card to the Alumni Register, M.I.T., Room E19-437; above all, PLEASE help your Secretaries prepare the Class Directory by sending in that questionnaire which was mailed to you in advance of the last reunion—the sooner all questionnaires are in, the sooner the directory can be completed. Thanks for your prompt help!—**Carole A. Clarke**, Secretary, 608 Union Lane, Brielle, N.J.; **Edwin T. Steffian**, Assistant Secretary, c/o Edwin T. Steffian and Associates, Inc., 19 Temple Place, Boston, Mass. 02111

# '22

Our mid-December weather report from Buffalo indicates no snow and 55 degree temperature. The early snow storm passed south of us in the ski area but the

warm weather will now ruin the slopes. Our United Fund totalled \$7,431,000 at 102% of goal giving great satisfaction to twenty thousand happy volunteers and especially to "unowho." Your Secretary is now bringing to completion the final planning for the Centennial Celebration of the Buffalo Club, an organization started by Millard Fillmore in the "horse-and-buggy days." . . . In our constant reminder of the June Reunion, this poem hit me as being most appropriate: "My ego climbs the highest stair, Upon attending this affair, To see, as years have hurried by, How much more they have aged than I. And I'm by far more in the pink—I think." . . . An interesting article in *Science News* of Washington quotes Dr. **Daniel Patrick Moynihan**, former Secretary of Labor and now Director of the Harvard-Massachusetts Institute of Technology Joint Center for Urban Studies in Boston. Dr. Moynihan believes that the present problems of cities are primarily social rather than physical and the cities are getting better, not worse. The Joint Center is currently engaged in two major urban research projects—one in Boston and the other in the new Venezuelan city of Ciudad Guayana. About a year ago the Ford Foundation granted the center \$1.4 million to expand its work. We are indebted to Donald S. Fraser, '28, of Pittsburgh for news of our classmate, and his neighbor, **Hector A. Lopez**. Hector has been troubled with arthritis and reported that he probably would not be able to attend our 45th Reunion in June. He is an avid reader and has taken a great interest in politics, doing more than his part to help elect the right kind of politicians, especially Republicans. We will immediately send greetings to Pittsburgh and confirm our voting record. . . . The clipping sent in by **William H. Mueser** tells of a memorial service for **Harold J. Payne** in St. James Episcopal Church in November. He had retired in 1962 as vice-president of the F. W. Dodge Corporation. Our sympathy is extended to his widow and his daughter. The sympathy of the class is also extended to the families of: **Robert R. Culbert, Jr.**, of Jamaica Plain; **Gerald S. Jenkins**, St. Louis, Mo.; Brig. Gen. **Robert A. Willard**, Miami; and **Maxwell B. Seder**, Worcester. . . . Among the changes of address notices are: **Rev. Theodore S. Wray**, Springfield, Pa.; **Julian E. Brash**, Philadelphia, Pa.; **John A. Chapman**, New Ipswich, N. H.; **Charles S. Comey**, Grosse Pointe Woods, Mich.; **Robert N. McClellan**, Norwood, Mass.; **Dr. Roland G. Macdonald**, Kalamazoo, Mich.; **Charles J. Molloy**, Rumson, N. J.; **Douglas M. Burckett**, Lincoln, Mass.; **H. Ward Doeblér**, Boca Raton, Fla.; **Winston A. Gardiner**, Seattle, Wash.; **John B. McCue**, Summersville, W. Va.; **Charles W. Maschal**, Laguna Hills, Calif.; **Dr. Charles G. Moore**, Green Valley, Ariz.; **Waller V. Morgan**, Pompano Beach, Fla.; **George A. Shattuck**, Sarasota, Fla.; **Dr. Francis G. Wells**, Sarasota, Fla.; **John H. Wishman**, Hot Springs, Ark. . . . Since the "welcome flag" is always flying at the home of **Frank Kurtz** in Del Ray, your Secretary hopes to join other classmates in calling there this win-

ter. Their '66 Christmas card shows their trip map to Nassau, by steamer through the Panama Canal to Los Angeles, then by car to Yosemite, San Francisco, Portland, Seattle and Vancouver, and finally by ship down to Acapulco and back through the Canal to New York. That's why we didn't see them last June at the Institute. However, they will attend the 45th. In the meantime keep warm, dry and healthy.—**Whitworth Ferguson**, Secretary, 333 Ellicott St., Buffalo, New York 14203; **Oscar Horovitz**, Assistant Secretary, 33 Island St., Boston, 19, Mass.

## '23

The following appeared in the *Boston Traveler* December 1, 1966, under a good picture of Dave and his wife, "Mr. and Mrs. **David W. Skinner** of Waban were among the Boston Opera associates invited to dinner at the Sheraton-Plaza last night before the twice-postponed production of Schoenberg's *Moses and Aron* at the Back Bay Theater." . . . The following is quoted from a letter from **Frederic S. Mann**, "I still live at 41 Pembroke Rd., Weston, Mass. 02193, where I have been located since 1953. Perhaps after I retire from the Telephone Company at the end of January '67, we will move. Helen and I spent some time at Troy Court in Norwich last summer. . . . The *Cross Tie Bulletin* for August 1966 reported the following: "**Alfred E. Perlman**, President, New York Central System, was the honored guest and speaker at the Railway Tie Association's 48th annual convention at the Chase-Park Plaza Hotel, St. Louis, Mo. He addressed those attending the annual luncheon on the second day of the convention. Under Mr. Perlman's direction, the Central has invested more than \$500,000,000 in an extensive physical modernization. It has installed 2,593 miles of centralized traffic control, has built four electronic freight yards, has mechanized its maintenance of way and maintenance of equipment programs, has adopted a revolutionary system of containerization, and is making full utilization of modern electronic machines and techniques, including the application of computers to railroad operation. As president of the Central, his posts include president, member of the executive committee and a director of Indiana Harbor Belt Railroad, Cleveland Union Terminals Company, Chicago River and Indiana Railroad Company, chairman of the board, a member of the executive committee and a director of the Pittsburgh and Lake Erie Railroad Company and Realty Hotels, Inc., chairman of the board and a director of the Lake Erie and Eastern Railroad, president and a director of Cleveland, Cincinnati, Chicago and St. Louis Railway, Michigan Central Railroad, New York and Harlem Railroad, and Toronto, Hamilton and Buffalo Railway Company. In addition Mr. Perlman is chairman of the Eastern Railroad President's Conference. Mr. Perlman is a trustee of Denver University and a trustee of the American Heritage

Foundation. He is a director of the Association of American Railroads, the New York Convention and Visitors Bureau, the Commerce and Industry Association of New York, the Maine Midland Grace Trust Company of New York, the Transportation Association of America and the National Coal Policy Conference. His memberships include: New York Railroad Club, Traffic Club of New York, the Economic Club of New York, M.I.T. Corporation, and the Sky Club. Aside from his avocation as well as his vocation, he enjoys swimming and hunting. . . . While attending an all-day annual seminar, "A conference all about soil," December 2, 1966, at New England College, Henniker, N.H., your Secretary met **P. S. Rice** (Cy), Associate Professor of Civil Engineering at Tufts University. He counsels all freshmen and sophomore engineers. "Cy" lives at 59 Outlook Drive, Lexington, Mass.

Word has been received from the Alumni Office of the death of **John Schuber**, 204 Dorchester Rd., Westvale, Syracuse, N.Y., on September 18, 1965, but no further details are available at this time. . . . The Alumni Office gives the following changes of address: **William L. Barclay**, 38 Bretton Rd., Scarsdale, N.Y. 10583; **Charles W. Cristal**, 20676 Fairmont Blvd., Shaker Heights, Ohio 44118; **George W. Gilman**, 27½ Atlantic Ave., Rockport, Mass. 01966; **Wanton E. Gladding**, 1301 Country Club Rd., Kinston, N.C. 28501; **John J. Gray**, RD 4, Easton, N.C. 21601; **Thomas Jefferson Hails**, 1005 Wickford Rd., Vestavia, Birmingham, Ala. 35216; **A. Raymond Holden**, 2812 Woodcrest Dr., Sarasota, Fla. 33580; **Seth G. Lewis**, 520 Broad St., Newark, N.J.; **Luis Ruiz de Luzuriaga**, Apt. 52, 226 W. 75th St., New York, N.Y. 10023; **Miles Pennybacker**, Voltarc Tubes, Inc., Box 688, Fairfield, Conn., 06433; **Wilson Potter, Jr.**, P.O. Box 7505, Arlington, Calif. 92503; **Robert B. Prinz**, 5711 Barbanna Lane, Dayton, Ohio 45414; **F. Robert Robinson**, 30A E. Center St., Rutland, Va. 05701; **Jules H. Werner**, 1457 Broadway, New York, N.Y. 10036; **George W. Bricker**, U.S. Aid Karachi, APO, New York, N.Y. 09271; **Clyde B. Doolittle**, Box 160 RR #1, Beaton Rd., Dennisport, Mass. 02639; **David Grellick**, 801 East Jasmine Rd., Lehigh Acres, Fla. 33936; **Robert L. Hershey**, E. I. duPont de Nemours & Company, 9130 du Pont Bldg., Wilmington, Del. 19898; **George H. Hurley**, Box 412, Fern Park, Fla. 32730; **John S. Keenan**, 9 Coulson Ave., Toronto 7, Canada 3CA; **Mrs. James A. McDonough**, 1110 Beacon St., Brookline, Mass. 02146; **William L. Merrill**, 142 West End Ave., New York, N.Y. 10023; **Howard Millet**, 528



Miguel F. Amezcaga, '24

Central Ave., Naples, Fla. 33940; **Henry Y. Satterlee**, I.T.T. Cannon Electric Company, 3208 Humboldt St., Los Angeles, Calif. 90031—**Forrest F. Lange**, Secretary, 1196 Woodbury Ave., Portsmouth, N.H. 03801; **Bertrand A. McKittrick**, Assistant Secretary, 78 Fletcher St., Lowell, Mass. 01852

## '24

As hoped for, the Christmas mail was most productive. To all of you who sent Christmas greetings, our sincere thanks. To those who added a spot of news, our blessings. From a correspondent's standpoint, too bad that Christmas comes but once a year. There's good news from Chicago. In September the CP division of St. Regis (that's the food machinery division of the well-known paper company), announced that **Miguel F. Amezcaga** had been appointed its vice-president for international operations. That's quite a jump for a man who, only four years ago, had to start a new life. "Read with great interest your last class news—everybody talking about retirement," said Mike. "But this 63-year-old Cuban refugee is starting over again and can't quit for years—if allowed!" Announcement of his promotion credited Mike with being "particularly instrumental in development of the broad world market coverage our company has enjoyed in recent years."

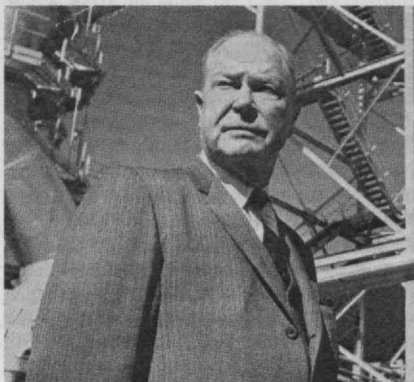
. . . The traveling **Ilfelds** are at it again. They recovered quickly from their lengthy summer-fall jaunt. By Christmas they were in Guadalajara, then went to Mexico City for a visit with Conchita Lobdell. A note from Conchita, by the way, says that she plans to come to Cambridge next June. It would have been Lobby's 50-year Reunion with the Class of 1917. . . . **Jack Nevin** and Gerry reversed the **Ilfeld's** route and came to the States to be with their children in San Diego for Christmas. Their daughter's husband, a Navy Lt. commander, expected to leave for Viet Nam at any moment. Jack has had a rough year physically with an unhappy assortment of disorders. No senior tennis championship this time. He does, however, remain active as vice-president of the Mexican-American Cultural Relations Institute, a flourishing organization. Gerry is on the board of directors of the International Committee for the Blind. Her group of about forty women raises about half a million pesos a year to carry on this work. . . . The **Paul Cardinals** are also busy as usual. Paul is development consultant to Columbia University's Institute of Nutrition Sciences. The Institute has plans for a new home in the huge complex at Columbia-Presbyterian Medical Center, and Paul is right in the thick of things. Lorene, among her other interests, is head of the Garden Department of the Women's Club of Upper Montclair. And of course with their children scattered all over the country they get around a bit. . . . A new honor, unique in our class, has come to **Phil Bates**. In September his local section of the Institute of Food



Technologists named him its "Food Man of the Year." Just in time, too. Next summer Phil retires from the Carnation Company, and presumably will be more concerned with food consumption than production. . . . Although his globe-girdling days are over, **Hank Simonds** still maintains many of the contacts he made with classmates through the years. Unfortunately this time the news he's had from the Phillipines is not good. **Chris de los Reyes** died just a year ago. There's no adverse report about **Emilio del Prado**, but two of his grandchildren were in the States for polio treatment. Mrs. del Prado came on for a few days to visit them. The del Prados, at last count, have 27 grandchildren! Hank went to the November meeting of the M.I.T. Club in San Francisco and caught up with **Harold Young** and **Mal Finley** there. . . . New York's Mayor Lindsay has appointed an 18-member Building and Construction Advisory Council to serve "as a pipeline of communication between the construction industry and the city administration." Among the "highly distinguished architects, engineers, builders and labor leaders" is **William H. Correale**, technical director of the Building Code Project and former director of design and construction for the New York City Board of Education. Bill's labors of the past three years on that code should certainly make him an invaluable member. . . . One of New York's distinguished builders, **Paul Tishman**, has been awarded the Great Silver Medal of the City of Paris "for his contributions to American-French cultural relations." This was a consequence of the seven-month exhibit of his collection of African art at the Musee de l'Homme which we told you about a while back. Next stop for the show: Jerusalem. . . . A recent article in *Business Week* was titled: "Why Allegheny Ludlum profits have soared." There were many reasons given, but the principal one was the shrewdness of **Edward J. Hanley**. "A-L's tall, ruddy-faced chairman and president has handled the problem of price erosion with a strategy that has combined diversification into other specialty steels with a massive cost-reduction program. To bolster profits, however, A-L this week increased prices 2½% as an offset to higher nickel costs." The article was accompanied by a striking picture of Ed looking stern and forbidding in front of a maze of steelwork at one of his new plants. . . . So much for this time. To those of you in balmy climes, keep the sunburn lotion handy. And to those who, like your Secretary, are retired but still in the North Country, be glad you don't have to slip and skid through commuter traffic on these chilly midwinter mornings, but can roll over and enjoy another hour's sleep—or two, if the spirit moves.—**Henry B. Kane**, Secretary, Lincoln Road, Lincoln Center, Mass. 01773

# '25

One of the pleasures of attending society meetings comes when one meets old friends. At a recent meeting of the Na-



Edward J. Hanley, '24, at Allegheny Ludlum's new Natrona complex.

tional Council of University Research Administrators held at the Mayflower Hotel in Washington, your Secretary had the pleasure of meeting and chatting with **George L. Washington** for a few minutes. As a result of that meeting, George has written a note addressed to the class of 1925, and it is quoted in full as follows: "It was indeed a pleasure to chat with our class Secretary recently, and to be silently reminded I haven't kept in touch with the class. I did want to be with you at the 40th Reunion but was changing jobs—at my age—just about that time. I was delighted to hear from the Secretary that some of you remember me. Of course, **Fred Greer** and I were in the same course and collaborated throughout the four years. But I'll be at the '70 gathering, if not on Mars or the moon, or sick in bed or enjoying my reward after life. Since leaving M.I.T. I have been dean of engineering and technical instruction at two colleges, assistant to the president at two, business manager at one, concerned with physical plant operation and development at all three, consultant on program and management at 33 colleges and universities (on payroll of each), consultant on education with two foreign countries, head of AID technical assistance team to Indonesia. At present I am assistant to the president of Howard University, having given up deputy directorship of the HHFA (HUD) College Housing Program. During the last War, I managed the Air Force's Primary Flying Training School at Tuskegee, Ala., and am now a member of the Trustee Board of the Air Force Association's Aerospace Foundation. So I have tried to carry on in the tradition of our class." . . . Notes such as this are greatly appreciated by your Secretary and, I expect, by the readers of this column. Don't you think it would be nice for more members of the class to take a few minutes to do the same? . . . Did any of you happen to read an interesting interview between Eliot Janeway, who writes for the *Boston Herald* and I expect other newspapers, and **Maxey Jarman**? In summary, the outcome of the interview indicated that the rise of Genesco is based on "consumer psychology." Maxey, as most of you know, is chairman of Genesco, Inc.

Two deaths have come to your Secretary's attention. **Kurt E. Lindquist** passed away in Detroit, Mich. No date has been

given. The information reached M.I.T. on November 26, 1966. . . . **Ave Stanton** supplied a news clipping from *The News*, Framingham—Natick, Mass., noting that **George F. Jourdan** died on October 16, 1966, at Lake Worth, Fla. George was prominent as an oceanographer with the United States Coast and Geodetic Survey, which he joined immediately following graduation and served until his retirement in 1962. In 1953 he received the Department of Commerce Meritorious Service award for outstanding performance in his field. In 1962 he received the Commerce Department's highest award, the Exceptional Service Award. This was "for outstanding scientific publications and for major contributions to the scientific community resulting from superior research accomplishments in hydrography, bathymetry and geology which significantly increased the scientific knowledge of the sea floor." He was a member of the Scientific Research Society of America, the International Oceanographic Foundation, the American Geographical Society, the American Congress of Surveying and Mapping, the Society of American Military Engineers and John Warren Lodge, A.F. and A.M. of Hopkinton. He leaves his wife, Winifred (Stewart) Jourdan, and a son Robert of Lincoln, Neb.

The Alumni Association's clipping service has provided some interesting information regarding **George A. Nelson**, Metallurgical Consultant in Berkeley, Calif. Prior to his retirement, he was staff metallurgist for Shell Development Company in the Engineering Department at San Francisco and Emeryville, Calif. Earlier he was metallurgist for Shell Chemical Corporation at its ammonia plant in Pittsburg, Calif. He has also been associated with American Smelting and Refining Company in San Francisco and the National Lead Company in Chicago. He attended Armour Institute, Lewis Institute, as well as M.I.T. He was a member of Sub-Group 11 of Committee A-1 of the A.S.T.M. He is also a member of N.A.C.E. and of A.S.M., Golden Gate Chapter, of which he is a past chairman. In 1965 he was selected by the American Society for Metals to receive the William Hunt Eisenman Award for outstanding contributions in the practical application of metals. A final reminder to all who have not yet made their contributions to the Alumni Fund—there is no better time to do it than right now!—**F. L. Foster**, Secretary, Room E19-702, M.I.T., Cambridge, Mass. 02139

# '26

All weekend your Secretary has been thinking how nice it was that class notes were not due for another week. At 4:45 Sunday afternoon I came across the reminder card and found they are due this week! At 4:55 I am underway after ten minutes of preparation. In ten minutes I have lighted a fire in the living room fireplace, made a martini on the rocks, turned the Hi Fi to suitable background music, spread the '26 folder on the floor

by my chair and hunted up a pad and pen. The only thing lacking is Heather at my feet, she is still too much puppy. The clippings and letters would be shredded in nothing flat. Since you can see we are in a festive mood, let's keep it that way and read you a letter from **Bob Sherwood** who writes from Beaumont, Texas. "I have very much enjoyed the November Class Notes and reminiscing about the various things that occurred. One thing I missed. As I recall you had publicly offered to furnish the recipe for Fish House Punch in the November News, and I have been waiting ever since. Am I correct or did I somehow miss the recipe that evening at your house? Anyway we would appreciate having it. I want to say again how much I enjoyed the visit to Pigeon Cove. Incidentally, I was delighted to see that you were using Don Q rum since it is a product of Serralles Distillery and Don Pedro Juan Serralles is my brother-in-law." Bob, I well remember that I promised to publish the formula, but I was waiting for someone to remind me. Here is what is needed to serve 20-25 (but it serves fewer if they happen to be of the class of '26): 2 qts. light rum, 1 qt. cognac, 4 oz. peach brandy, ¾ lb. sugar, 1½ pints lemon juice, 3½ pints water. Place large block of ice in a bowl, stir to cool and serve. Fortunately, before the reunion I happened to mention to a business associate that I expected to spend the next two evenings squeezing lemons and dissolving sugar. He tipped me off on the use of frozen lemonade which took only the time of opening the cans. So you see it is really a pretty simple concoction to brew up. It's very popular at parties in this sea going town. Good luck! We have before us a booklet containing the photos of six men with a write-up of their Distinguished Service to Boyhood. Each of these men was awarded the Silver Antelope Award of the Boy Scouts of America. I immediately recognized two of the photos. One was General William C. Westmoreland, an Eagle Scout. The other I recognized was our classmate **Bill Latham**. The write-up on Bill is as follows: "William Latham, Niagara Falls, N.Y., is engineer for the Robert Moses generating plant, Power Authority of the State of New York, community leader, and scouter. Mr. Latham was a Boy Scout and Sea Scout, has served as a troop leader, pack committeeman, Camping Committee of the Queens Council, member and chairman of the Camping Committee of the Greater New York Councils, Executive Board member of the Queens and Greater New York Councils, district chairman, Executive Board member and president of the Niagara Frontier Council. For many years Scouting has been the beneficiary of his foresight and abilities in making plans for long-range service to boys. A respected citizen, graduate of Massachusetts Institute of Technology where he was an honor student, member of Scabbard and Blade, captain of the varisty crew, and a leader in significant Alumni activities, Mr. Latham has served as a member of the board of the Museum of National History, Long Island Park Commission, American Society of Civil Engineers, Disaster Control

Board, Chamber of Commerce, and Chairman of the Advanced Gifts Cultivation Division of the United Givers Fund. He was awarded the Silver Beaver in 1946. In recognition of his devoted efforts on behalf of boyhood, Region Two honors William Latham." Bill, the class is proud of you. . . . A letter from **Joe White** is self-explanatory. "Please change my address to Vista, Calif. I have retired to a home in the country of sunny California. I am grateful that my health is very good so I'm looking forward to my retirement. I was sorry to miss our 40th reunion, but I will not be East this year. I'm always interested in the '26 class news. Where are **Reginald Wakeman** and **Rufus Briggs** now? We miss seeing their names in the news." In reply to Joe, Reginald Wakeman was listed in the last Register as vice-president and technical director of Onyx Chemical Corporation, Jersey City, N.J., and Rufus Briggs as vice-president Electrarc Inc., 20 Pemberton Square, Boston. . . . A letter from **Eben Haskell** expresses his enthusiasm for the short time he spent at the reunion. "Sorry I had to depart so unceremoniously from the Alumni Day festivities. A call to the office resulted in an urgent request to head back to New Haven. I was back at headquarters at 8:00 p.m., and the strike was called at 11 p.m. Ever since my hours have been erratic and long. The little taste of the weekend from Sunday afternoon to Monday afternoon made me realize what I had really missed, that was an opportunity to see many and talk to many. We had both been looking forward to the banquet and some dancing to Glenn Miller, one of our favorites from many years in the past. It was gratifying to learn that our efforts to raise enough money for the Killian fellowship was successful, and **Austin Kelly** and his hard-working committee should feel very proud of the results. I never did get a chance to see him or **Dave Shepard**. I really hadn't been on the Institute grounds since 1960; it was very impressive to see the changes. There were so many I had hoped to see, and another five years will bring so many changes. Outside of **Don Chase**, who lives in the New Haven area, and **Tom Green**, I hardly ever see any '26 men. When you come through New Haven, hope you will stop by." . . . **Martin Staley** was recently cited by the Rotary Club of San Antonio for his engineering achievements in Texas and Oklahoma. Martin has two daughters and 17 grandchildren. He pursues a hobby of building model railroads and has rolling stock of 30 locomotives, 100 freight cars and 50 passenger cars. He is also proud of his six-volume stamp collection. He sends his regrets for not being able to attend our 40th reunion. Well, the martini I have been sipping has disappeared, the fireplace needs a little poking to liven up the fire and Ruth has just announced that English muffins, jam and tea will shortly be served in front of the fireplace. Writing notes after sunset without the distractions out on the ocean has been quite efficient, only an hour and a half including "preparations." Guess we will have to try it again. Till March.—**George W. Smith**, Pigeon Cove, Mass.

"Time has gotten to be one of those things you can't hardly get no more off! When I get back to the U.S., I won't know what to do without my 20,000 words or more a week that now flow from my pen into reports for the Ministry of Economy and the plant owners, discussing weaving, spinning, printing, merchandising, financing. At the same time, trying to keep up-to-date with my family of three grown children, a hundred friends, Hugh Gregg's unsuccessful attempt to become governor of New Hampshire again, **Bob Bonnar** and the Reunion, the Alumni Association as Iran chairman,—I am really written out at the end of the week." So begins **Glenn Jackson** in a joint and long letter to **Jim Lyles** and me from Iran. He continues: "We got a wonderful cheery letter from Molly and were glad to know of Jim's progress and that the Lyles are planning to be at the Reunion. Unless I can find some real legitimate excuse that would bring me to New York on business, I am afraid we will miss the big reunion of the greatest class. I get two months vacation home leave starting September, 1967. At that time we will return via the Orient and South Pacific, possibly part of the way by relaxing ships. . . . Betty began her new job in September, chief librarian of the American School here in Teheran (1000 students, grades 1 through 12), and she loves it. She was trained for library work in college and has worked in libraries off and on over the past 30 years. . . . Daughter Ann having finished her first year of teaching after college, came over last summer for two months, and we had a chance to show her many places in Persia that we were seeing for the first time. I borrowed a Mercedes and Betty, Ann and I braved the hot desert roads for about 500 miles to get to Persepolis and the ruins of Darius' palace (500 B.C.). Temperatures at noon approached 120 on the desert, so we usually got on the road about 5 A.M. and tried to reach the shelter of a modern hotel room by noon. Then relax until sundown before going out to explore the shops and bazaars." The trip took the Jacksons on to the Caspian, Greece and Turkey. You have all received letters from Glenn about our class gift. These were printed and the envelopes addressed here; all copies were shipped by air freight to Teheran where the personal notes were added, and then mailed through the Iranian postal system, which had them all here by ship mail in about six weeks, finding you all hopefully, in a mood to send in your checks. You have probably noted the improved quality of the paper on which the class notes are printed. Photographs are also allowed. Photos, in black-and-white or color, of groups or individuals, are wanted to accompany our news items. Another change which is occurring is that alumni holding master's or doctor's degrees but not a bachelor degree from M.I.T. will gradually be covered in the class notes by Course Secretaries. So far not all of the courses have found secretaries, so wait



for a notice about your course. Graduate students of Course VI had a good write-up in the November issue.

**Les Woolfenden** is enough recovered from his operation to handle a K.P. shift at a struck plant. This word, of course, came from Ethel. Maybe we ought to have a separate class secretary for the wives. Ethel says the men are too modest to write about themselves but the wives would. . . . Such terms as "the complete architect" and "a colossus" are applied to **Edward Stone** in the October 8 issue of *Business Week*. It says, "Stone is a genuine triple threat. Not only is he considered as versatile a designer-draftsman as there is in the country, but also a natural at attracting—and pleasing—clients, and an effective administrator. . . . Professor **Allan T. Gifford** will head a newly-inaugurated education program for Massachusetts state and municipal employees, leading to a bachelor of science degree at Lowell Technological Institute. The program was announced by Governor Volpe. . . . **Mather Garland's** widow has advised of his death on August 6, 1965. He was president of the Garland Ventilator Company of Shakopee, Minn. He had moved from Chicago to the Minneapolis area in 1944 to go with the Roto Plow Company and later was vice-president of the K-Gar Corporation of Shakopee. . . . Very belated word has been received of the death of **Louise Wingate** of Fitchburg, Mass. She was a special student at Tech, later taught at the Fitchburg Normal School.

What was happening 20 years ago? Warren Smith had died suddenly; Bob Wise was named a director of the International Association of Ice Cream Manufacturers; Larry Coffin was superintendent of Goodyear's plant in Sao Paulo, Brazil; James O'Dowd joined the Cistercian Monastery, Valley Falls, R.I.; Dave Truax was elected chairman of the Carolinas-Piedmont section of the American Chemical Society. . . . When you read this there will be about 100 days left to reach the goal set for our class gift. It is difficult to add anything to the annual letter which **Bill Taggart** wrote last month for Jim Lyles. At that time, 53% of our proposed gift had been raised, leaving a big job to be done. There is no question about what needs to be done to correct the situation, and everyone's help is needed.—**Joseph S. Harris**, Secretary, Masons Island, Mystic, Conn. 06355

## '28

Present at a reunion executive board meeting at **Abe Woolf's** office in December were reunion chairman Woolf, associate chairman Florence Jope, class chairman **Jim Donovan**, and your class Secretary. **Charlie Worthen** was unable to come up from Little Compton, R.I., where he is in hibernation for the winter months. Many important matters were discussed, and Abe announced that he would soon compile a list of committees. We did talk about a class reunion, a sort of junior reunion, to be called our 39th and to be held one day during Alumni

Week early in June of 1967. No definite date has been set, but it will probably be held the Saturday or Sunday before Alumni Day. From Eastman Kodak Company we learn that **Ralph Evans**, director of the photographic technology division of Eastman Kodak, was to speak on various aspects of color on November 16 at the Franklin Institute in Philadelphia. The report goes on to read that, "Evans will discuss two ways in which color may be seen (light-color and object-color), colors that are apparently fluorescent, and adaptation to the color and brightness of light. Using slides for illustration, he will also present the theory that there are four principal ways in which two object colors may differ from each other: hue, saturation, brightness, and grey content, and that these four are independent psychological variables. An authority on color processes and visual effects in photography, Evans has written the books *Eye, Film and Camera In Color Photography*, and *Introduction to Color*." He has also lectured widely in the field and has written several articles for scientific journals on the relationship of perception to color photography. Evans has served as secretary of the Inter-Society Color Council since 1952. He received the Society's Godlove Award in 1959. Born in Haverhill, Mass., Evans was graduated from M.I.T. with a B.S. degree in theoretical physics. . . . From the *Fitchburg Sentinel* of recent date we learn that **George Chatfield** will serve as vice-chairman in next year's United Fund campaign. George is president of WFGM, Inc., Music Services Corporation, and publisher of the *Montachusett Review*. He is a former director and vice-president of Benton & Bowles, Inc., and former executive vice-president and director of William Esty Company, Inc. "George is now serving the community as a director of United Fund of Greater Fitchburg, Inc., YMCA, Chamber of Commerce, and Fitchburg Rotary Club. He is a member of the Special North-South Toll Road Commission, the Mayor's Advisory Committee on Economics, an advisory director of the Fitchburg office of Worcester County National Bank. . . . And in a December issue of the *Boston Sunday Herald*, we recently noted photographs of two charming and handsome young ladies, accompanied by the caption: "Double engagement. Mr. and Mrs. **William Johnson Kirk** of Newtonville and West Falmouth announce the engagements of their daughters, Miss Anne Williams Kirk and Miss Mary Parker Kirk. Miss Anne Kirk, a Lesley College graduate, is engaged to Mr. John Thomas Shea, Jr., son of Dr. and Mrs. John T. Shea of Foxboro. He prepared at St. John's School for Boston College. A July 8 wedding is planned. Miss Mary Kirk, also a graduate of Lesley College, is engaged to Mr. David William Schilpp, son of Mrs. Anthony Schilpp of Newton and the late Mr. Schilpp. He is a graduate of Boston College and is a member of Delta Sigma Pi fraternity. An August 19 wedding is planned."

Much of the remainder of these notes will be devoted to various memos from our class chairman and treasurer, Jim

Ralph M. Evans, '28



Donovan. To spare typewriter use, we'll omit quotes. I recently found a note that **Bill Hurst** telephoned and amongst other things he is planning to charter a 50' yawl and do some real sailing. He plans to buy a larger sailboat for himself shortly. He also reported that **Bill Woods** is O. K. . . . For some time a New York group of '28ers have met for lunch at the Chemist's Club. **Ray Wofford** asked me to come and talk with the group about the reunion on Thursday, December 1. They were all true '28ers—each one different, each pleasant and each vitally alive. **Claude Rice** enjoyed harassing me a bit verbally—and pleasantly remarked on it afterwards. **Tommy Larson** was his always warm and friendly self. **Bob Murphy** was quiet; unfortunately I didn't talk with him as much as I wished. During the lunch **Bob Larson** telephoned to say he was sorry he hadn't been able to come over—wanted me to know that he was putting some shares of stock in the mail as his participation in our 40th reunion gift. (I'll be glad to have a telephone call from each of you with this kind of news!) Ray is very active with National Biscuit and his golf; says he's going to live to be 90 in order to shoot his age! He is looking forward to a bang-up 40th and then he and Edith retire to San Francisco. Bill Murphy wants a plain old-fashioned reunion—not too much learning, as he uses his head all his life in his work. Wants to relax at a reunion. I think he's kind of looking forward to a poker game with Bill Kirk. **Lazare Gelin** says he met Abe Woolf over in Israel in October. **Ed Ure** and **Bob Krummel** showed slides of previous reunions, and we all enjoyed seeing old friends and thinking of pleasant times. **Frank McGuane** told me about his wife and five children. When one was married, the others gave Ma and Pa the present of a second honeymoon trip of their own—a most friendly and generous idea. **Terry Hurlbut** has now retired—spent six months in Europe—and like it all. Good old **Ted Pierce** was as much fun as ever. **Starke Dempewolff** showed up and was as pleasant, warm and friendly as ever. (I wish those who were present and I haven't reported on would write a letter that we could use for class notes; and for that matter, I wish all '28ers would write a letter or two. Incidentally, the day before the luncheon one New York '28er telephoned to say that he was sending up a five figure gift for our 40th fund. Our unanimous if anonymous thanks to him. There are some five and six figure gifts to come—the Institute is looking forward to them! And to those from each and every man and woman of '28 who participates with the class and gives generously. . . . While in California I called **Al Hibbard**,

a vice-president of Lockheed, but he was out of town. I have a feeling he was on a hunting trip. Then I went up to Detroit and had the pleasure of talking with **Bob Kales** and having lunch with **Stan Humphrey**.

Bob is head of Whitehead & Kales, a very successful steel fabricating firm that has made 85% of those racks on railroad cars which we see carrying automobiles from the point of manufacture to the place you and I buy them. Bob and his son had just been up hunting. He has just retired as captain in the Naval Reserve and I believe just finished a term as national commander of the Veterans of Foreign Wars. Stan and his family have developed a keen interest and I presume a competence in horsemanship. Stan has three horses, rides the hounds, and has some beautiful pictures of the horses on the walls in his office. I enjoyed luncheon as his guest at the Detroit Athletic Club. Stan himself "has retired", but this seems to mean that he simply drops some administrative functions and continues to work. He is planning to take much longer vacations—seems to like the Southwest. Stan and his wife have two children—the son living with them north of Detroit and the daughter married and living in Connecticut. . . . Two other memos from Jim: my excellent customer as well as loyal and friendly classmate, **Dave Oiken**, has been in the office several times. We do some work for Dave, and Dave on his part uses Saturday morning for considering machine design problems, and along the way we have a friendly chat. I was mad about various things and not accomplishing anything, so I sat down to read the results of the Alumni Officer's Conference. One man in there suggested that we try to get the wives to participate more. For instance, he stated that the wives could run an annual ball. Also that the wives could write letters about their family activities. We know the husbands in general are too modest to write to us but there is no reason why wives shouldn't write us an occasional letter telling us of family activities. We are quite enthusiastic about the idea that came out of this Alumni Conference.

It is with the deepest regret that we announce the death of **Donald Kennedy**. We recently received the following letter from the Society of Gas Operators and publish it in its entirety: "It is with deep regret that the Society of Gas Operators enters upon its records the passing of our fellow member Donald S. Kennedy on June 5, 1966, in Chappaqua, N. Y. at the age of 61. Donald S. Kennedy was elected to membership in the Society on May 23, 1953. He was born January 19, 1905, and attended grammar and high schools in Yonkers, N. Y. After graduating from the Peddie School in Hightstown, N. J., he attended Stevens and the Massachusetts Institute of Technology, graduating from the latter in 1928 with a Bachelor of Science degree in Mechanical Engineering. Following his graduation he was a statistician with the Engineers Investment Corporation in Boston, Mass. Since June 3, 1932, his career was centered in the Consolidated Edison Company of New York, Inc., and its predecessor com-

panies. Starting with the Westchester Lighting Company in sales, he progressed to assistant manager of their Commercial Engineering Department until World War II intervened. He served with the U. S. Navy from October 1, 1942, until December 9, 1945, and bore the rank of Commander, U. S. Naval Reserve. Upon his resumption of duties with the Consolidated Edison System, he participated in their Executive Development Program, following which he occupied executive positions in operating, construction, planning and engineering divisions of the Company. In June of 1966 he retired from active duty because of illness. He will be remembered by his many friends and associates in the gas industry for his wide knowledge of the many phases of its operations and for his contributions to the furtherance of the sales and utilization of gas. His keen interest and active part in the functioning of our Society was of great assistance in the development of the Society's aims. It was a privilege to have been associated with him over the years. The Society of Gas Operators hereby expresses its deep sorrow in the passing of Donald S. Kennedy and expresses its deep sympathy to his sons." —**Hermon S. Swartz**, Construction Publishing Company, Inc., 27 Muzzey St., Lexington, Mass. 02173

## '29

It will be M.I.T. Fiesta time in Mexico next month—March 9 thru 11. The **Bill Baumruckers**, who attended last year, highly recommend this gala event as "one of the more enjoyable things you've done!" If anyone is tempted to go, please contact Armando Santacruz B., M.I.T. Club of Mexico City, Reforma 116-804, Mexico 6, D. F., Mexico. And if you do go, please let us hear all about it. This will be the 19th annual M.I.T. Fiesta in Mexico. . . . Professor **Maurice E. Barker** of Fayetteville, Ark., sent us additional news of his accomplishments which include a novel published in December 1965 entitled *The Changing Seasons*—the locale is Northern Maine. . . . We will continue with the biographical sketches from classmates who have responded from Massachusetts. **Ralph Manchester** of Eastondale, Mass., is self-employed and is treasurer of Industrial Engineering Service Inc., having started his own business in 1944. Previous to that he was a superintendent in a machine shop for eleven years and had worked with the New York Telephone Company. Ralph's hobbies include hunting and fishing and though he is busy constantly, finds time to enjoy his family and grandchildren. . . . **Putnam Cilley** lives in Sharon and is an engineer for Jackson & Moreland of Boston. He is a member of A.I.E.E., and his leisure hours are devoted to sailing and ice boating. . . . **Willard J. Slagle** of Arlington has been president of Slagle's Inc. since 1936, except for four years during the war when he was commanding officer (colonel), Chemical Warfare Service Development Laboratory at M.I.T. Willard's son,

George, is vice-president of Slagle's. . . . **Karnig Dinjian** also lives in Arlington where he is self-employed in Reality Development and Construction. Karnig started his business ventures in the restaurant and catering business in Somerville which lasted for twenty-five years. During recent years he has been engaged in apartment house development which he describes as "something which I like best, and something that I was trained for." Some of his latest efforts have been the Commonwealth Court Apartments (off Commonwealth Avenue) in Boston, eight modern brick buildings with 126 units in all, and Parkway-Mystic, Delux, high-rise apartment house on Route 3 in Arlington. At the time he answered the questionnaire (September 1964) he was working on plans for an apartment house complex near Mattapan Square on a 16½ acre site with over 500 units, etc. But, that was two years ago so we need to be brought up to date. Karnig promises to someday show us movies of the 25th and 35th Reunions which should prove to be quite interesting! . . . **Myron Ryder** of Belmont is an engineer of utilization and air conditioning NEGEA Service Corporation. He is a registered professional engineer, member of American Gas Association Requirements Committee, and member of Gas Appliance Engineers Society. Myron has been in public utility work for thirty years and he says he thoroughly enjoys his work, though he is thinking of retirement in a few years. . . . **Howard L. Rich** of Newton is president and treasurer of Rich & Tucker Associates, architects in Boston. He formed his own company in 1957 which specializes in school and college work. Howard's hobbies consist of golfing, painting and birding and he adds, "Have enjoyed life and my work and have no great message to offer." He is active in the American Institute of Architects, Boston Society of Architects and a Trustee of Jackson Homestead, Newton. More next month and regards to all.—**John P. Rich**, Secretary, Box 503, Nashua, N. H.

## '30

November turned out to be a banner month in terms of information forms returned; a gratifying 70% of those mailed came back. However, quite a few of the returns were of the "name, rank and serial number" type that do not provide much grist for the notes. A little more detail would be helpful in some cases. . . . **Bart Delorenzo** and his wife recently returned from a European trip during the course of which they visited Bart's birthplace on the island of Salina which he left some 55 years ago. Salina is one of the Isole Eolie, a group of islands of volcanic origin about 20 miles north of Sicily. It is also about 10 miles from Stromboli which last erupted in 1908. Bart says Salina has a wonderful climate but not much going on. The islands are noted for a local wine called Malvosia made from a special grape that thrives on the volcanic soil. Production is very limited, so it is difficult to procure the wine



anywhere else. Bart and Gertrude live in Lafayette, Calif., where Bart is a manufacturer's representative operating as Barth Engineering Company. They have twin sons who are currently working in Germany and a married daughter. Bart lists as his main hobby, "rockhound: treasurer of local Gem & Mineral Society," which doubtless accounts for the fact that he was particularly intrigued to learn, during the course of his European junket, that Renaissance artisans used as many as 20,000 shades of Venetian glass in making their mosaics. . . . From **Charley Dwight** we have only the rather sparse information that he is assistant to the Chancellor of University of Hartford and president of the Hartford Boys' Clubs. . . . **Albert (Red) Deyarmond** is at the G. E. Center for Advanced Studies in Santa Barbara where he leads and participates in advanced studies of space vehicle and guided missile systems. The Deyarmonds have a son at Villanova Prep in Ojai and a married daughter. . . . **Ralph Draut** is chief structures engineer, Office of Supersonic Transport Development, at the Federal Aviation Agency in Washington, D. C. He has a son who graduated from the University of Maryland and is an engineer at Lockheed-Marietta, and two daughters. Ralph lists "choral singing (including barbershop)" among his hobbies and says that he has recently seen **John Schroeter** who has retired from government service and is "devoting a major part of his time to interviewing and encouraging prospective students for M.I.T." . . . **Arthur England** is acting director of staff services for the Connecticut Highway Department at Wethersfield. His work involves financial and engineering program coordination and scheduling. . . . **William R. Jackson** was recently re-elected treasurer of the American Institute of Steel Construction. . . . **Kenneth Tator** has his own consulting firm, Kenneth Tator Associates, in Carapopolis, Pa. His firm is known for its "corrosion engineering and weather dynamics studies. They have developed ingenious accelerated weathering devices to determine roofing performance characteristics." Ken holds several patents on corrosion barriers, plastic products and container linings. . . . **Frank Fahnestock** is an engineering consultant in the process design section of the Mobil Oil Corporation Engineering Department. His principal activities involve equipment for crude distillation, lubricating oil processing and cracking. He has an impressive list of extracurricular activities including trustee of the Village of Roslyn Harbor, chairman of the Roslyn Area Coordinating Council (villages and civic associations), chairman of the Engineering Committee Council for Community Preservation, and vice-president of the Roslyn Landmark Society. He also teaches company refresher courses and an undergraduate course in distillation. His son John attended University of Alabama and was in the first airborne infantry unit to land in Viet Nam. Since completing his military service in 1965, John has been working as an electronics technician and taking a night course in Business Administration at C. W. Post

College. Frank's daughter graduated from Vassar in '65 and is currently working for Francis I. duPont as a portfolio analyst and taking a night course in finance at N.Y.U.—**Gordon K. Lister**, Secretary, 530 Fifth Avenue, New York, N. Y. 10036

## '33

It is our fond hope that having received the November issue of the Review, our classmates will arise with renewed vigor and drop us a line or two in the period when material is sketchy at best. We sure need all we can get at just this particular time of year. On January 1 of this year **Andy Regan** was promoted to manager of the Mechanical and Electrical Purchases Department, a job which apparently involves the purchase of all but raw materials, such as chemicals. He is still learning a lot that he never knew before. It seems that Andy and Arlene are just the same as they were at the 25th, except eight years older, and they both will be at Chatham Bars Inn come June 1968. He sees two old Course II fellows and their wives, **Joel Stevens** and **Ray Smith**. Joel, it seems, is still at T.E.C., has done some very fine development work on cigarette filter equipment, and has been granted several patents on same. Ray Smith is plant manager of American St. Gobain's new \$40,000,000 plant just outside of Kingsport. Andy adds, "Occasionally we see other classmates who come through here on business. **Cal Mohr** always calls when he is in the area. I think that Cal does a good job of keeping in touch with many of the class". Speaking of Cal Mohr, I have had a short letter of his for almost a month and have not been able to use it. As of October 18, 1966, Cal predicts that **Morris Cohen** will give a paper before the American Society for Metals on October 31st entitled "Mechanisms of Ausform-Strengthening in Iron-Nickel-Carbon Steel," with David W. Hoffman, and another paper with D. Kalish entitled "Mechanism of Strengthening by Strain Tempering." Cal also mentions that Morris will, at the same meeting, be part of a discussion group on the keynote paper "Structures and Strengthening Mechanisms in Carbon Steel Wire." . . . Also as of October 18th **Bill Murray**, Professor of Mechanical Engineering at M.I.T., is to be chairman of a symposium on the experimental mechanics of the society of non-destructive testing, to be held in Chicago on November 2, 1966. Cal avers that all of this information comes from the *Metal Showman Newspaper* which promotes the combined metal shows, including this extended Chicago meeting. . . . Now we get around to explaining something which has already appeared in this column. The names **Ivan Getting**, **Dave Treadwell**, and **Leonard Cirker**, as well as Admiral **Curtze**, were mentioned with, or at least closely to, full or part-time teachers. For the record Ivan was captain of the gym team, Dave was a member of said team for three years, and Leonard worked out with the team but was not a member. Cal, it seems, was

manager. . . . It now appears that **Otto Putnam**, Director of Operations for Althouse Chemical Company of Reading, Pa., has written an article, "Filter Press Service Life Boosted Tenfold". This was written for the *Chemical Processing Magazine*. This makes five or perhaps more papers by Otto on his favorite topic. . . . From Cal's "second section," he made an Alumni meeting in Chicago, October 25th, and was the only 1933 there. One week from today I expect to see and have a meal with Cal in Chicago; at which time I just might find out more secrets.

I have a short and terse note from **Ellis Littmann** who has been doing a little sleuthing it appears. ". . . to show that I am keeping up with my business, I have come up with some class news, though not too recent. Do you remember **Warren H. Pease**? Recently one of our associated companies was in touch with a distributor in Minneapolis headed by a Warren Pease. It developed that this Pease is the son of our own Warren H." Poor Ellis, nothing happens in St. Louis, other than that which has already been reported. Ellis, I want to hear more about **Slick Henderson**, as any man who can progress from selling cheese, to operating his own architectural and engineering firm must have something happen to him rather often. . . . About two weeks ago I wrote a short plea for information, with a return feature, to seven men. To date I have heard from one of them. The plea was sent to a few who could easily let me have a page or two, a few who are not degree holders (from M.I.T.), and a couple from whom we never hear. I did hear from **Charlie Keller**, a West Point grad who joined us for a couple of years, and took an S.B. when we did. Inasmuch as I hope to talk Charlie into attending the 35th, I will give him some extra space. He married his southern sweetheart during a Christmas vacation, while at M.I.T., and went back this last fall to the Alumni Seminar, living for three days at Baker House. Charlie sent me his entry in *Who's Who in Engineering*, and his take is about three inches of Michelin type of abbreviation. Expanded, this three inches would have been a page and a half, at least. Briefly, and only partially, Charlie got out of West Point in 1930 and M.I.T. in 1933, with a degree and commission from one, and a degree from the other. He and Rosa have three children, Charles III, Mary and Caroline. I now continue to quote briefly: 1930 to 1939, U.S. Army Corps of Engineers; 1939-1941, officer of National American Bank of New Orleans; 1941 to 1946, active duty, Corps of Engineers, going from captain to colonel, with '43 to '46 with engineer troops in Europe. Started Keller Construction Company as president in 1946. Also, is president of General Enterprises, Inc.; member of many professional societies, including all you and I can think of, both National and local; active in New Orleans civic affairs including president of the United Fund one year, and is a past president of the Travelers Aid Society; has several fine decorations from his military career, including the Bronze Star with two oak leaf clusters, Legion of Merit with

oak leaf cluster, the Legion of Honor, Croix de Guerre; very active in social work, and belongs to the New Orleans Country Club. This is a very, very distinguished record, any way one looks at it. We are glad he went to M.I.T., and we Course II men are more than pleased that he decided to become a mechanical engineer. . . . Now comes **Frank (R.) Heselton**, Corps of Engineers, Sault Ste. Marie Canal, Michigan. Briefly, Frank is still with the Army, is still greatly interested in school board work, at the state and national level. He has just finished another chapter on *The Making of a President* (of the National Federation of Federal employees). Frank's activity in school board work involves some public speaking, addresses to the M.A.S.B. et al. (state level). He is on the Michigan State Board of Directors. At a N.F.F.E. national meeting in Miami Beach a few months ago, Frank's wife started a siege in the hospital, in traction, due to a protruding disc. The end result was the removal of the offending disc, and the substitution of seven inches of shin bone for replacement use. Further, and surely not the least of happenings to this nice couple, their 20-year-old daughter prepared the complete Thanksgiving dinner, with a couple of pies thrown in. Frank says that this was the making of the little gal, and I must quite agree. . . . What appears to be an annual feature has just come in from Helen and **Art Hungerford**. You will recall that Art is in charge as chairman of the major in broadcasting at Penn. State University. As of about a year ago, he took a trip around the world, mostly business, working in Algiers, Manila, and thence home via Tokyo and our West Coast. He tells it so fast as to make me think that he used the jets, rather than the ships; fast but less fun (at least for me). With a flash of modesty, Art says that he has students far more brilliant than he ever was. Daughter Gale was married on May 28 to Richard Krwaiec, a high school classmate. Dick is attending the School of Business at Penn. State, and the couple is living in a fine mobile home. Art and Helen are soon to become grandparents. You are really a little late, Art, but still a welcomed member of the grandfathers club (soon). Helen is rapidly catching up with her degree work heading towards her masters in the theater arts, to finish in June. Art again went to Asia in June with another colleague from the University of Nebraska to study the possibilities in regional cooperation in educational radio and television. They visited Manila, Bangkok, Singapore, and Kuala Lumpur, all for AID. Art and Helen both went to Central America (Honduras) in September to do a study of the radio schools for the Educational and Cultural Bureau of the State Department. They returned through Guatamala and Mexico City, but as tourists. In October they spent a few days in Williamsburg at a Board of Directors meeting of the Association of Professional Broadcasting Education. That's it from the Hungerfords, and many thanks. Again in passing and as an aside, each and every letter and card from classmates receives a personal reply,

longer or shorter depending on the amount of time available at the time. To those kind folks who write me, please do not expect me to quote all you write. In some cases there is no way of paraphrasing. Some items are too long, some are too personal, many have comments on politics, religion, etc. I have been scolded a couple of times for omitting something that a classmate thought should be a part of the notes. In another case, which works the other way, one classmate stopped sending in material because I suggested that the rival political party might have some merit in its thinking. It is indeed fortunate that the Review has a Class Notes Editor, so that we, the Secretaries, may have someone to blame if certain material is deleted. Also, if anything undesirable is written by us, it too, will be submerged. Most letters are noncontroversial, and items left out are usually censored right here at my typewriter. So, please, no scolding. And, in a sweeter vein, I want you all to write and often, and if you must scold then do so, but please write. . . . **Charlie Fulkerson** was one of the seven I wrote to a few weeks ago. Charlie, Heidi, 9, and Elizabeth had just returned from spending Thanksgiving in Williamsburg, and it appears to Charlie that they will have to spend Christmas at home and, as he puts it, alone. Why? All three of the older children are in California near San Francisco. Chuck is a freshman at Stanford, studying art and creative writing. Martha is teaching in the elementary schools in San José, and Mary's husband will be getting out of the Navy soon. I recall that Charlie and Elizabeth are one of the few couples who always have had one or more of their children with them at Reunions, or at least since the 25th, and I am not real sure but that they had the youngsters with them at the 20th. They see **Ed Goodridge** at Lake Candlewood occasionally during the summer, though there is nothing to report. Ed had the original corporation (induction heating stuff), sold out to someone making railroads, got it back after litigation, in the meantime started Goodridge Engineering, Consultants, on 42nd Street, started two new corporations someplace in Connecticut. One of the four corporations, or more than one, is supporting the Goodridge family; Which one or ones? To get back to Charlie Fulkerson; he sees **Cy Hapgood** in N.Y.C. quite often, inasmuch as Cy's firm handles Charlie's patent work. Further, Charlie sees Dick Stewart, '32, in Waterbury, once in awhile. Charlie, it seems, has unloaded a lot of his extra civic work but still serves on the Roxbury, Conn., school board and on the Roxbury Historic District Commission.

Inasmuch as I must go away for a little while, I just must close this month's chapter. There are numerous address changes, mostly spurious (zip change only), to wit: **MacLean Brown**, VI; **John Dahlberg**, XVII; **Capt. Ezra M. Ellis**, XVI; **John W. Gardner**, VII; **Nat Goodman**, XV; **Jim Hayes**, II; **Bill Laird**, IXB; **David Little**, II; **Richard Molloy**, XVI; **Edward Meehan**, II; **Eugene Nedbor**, I; **Francis T. O'Hearn**, VI; **Preben Oldenberg**, III; **Sam P. Robinson**, XA; **Harry Summer**, XV; **Dr. Henry J. Welge**, X; **Mrs. Muriel B.**

**Wilbur**, VII; and **Robert C. Wellwood**, IA. . . . We are again saddened to hear through official channels of the passing of **Leland L. Lewis** of Seattle, Washington, a man that I did not know personally. I have written to the family, and perhaps I may have some few details next issue. . . . Gentlemen and ladies of the class, you have a letter from President Goodridge about the forthcoming 35th Reunion, Chatham Bars Inn, June 1968. Please mark your calendars. It is later than we think. It is to be a bang-up affair, next biggest reunion to date, says Turner. That's it.—**Warren J. Henderson**, Secretary, Drawer H, Fort Rock Farm, Exeter, N.H. 03833

## '35

**Bill Abramowitz'** interesting letter to **Irv Banquer** features this installment of our class notes. Bill wrote after returning from a visit to Israel and a week's tour behind the iron curtain in Roumania. Bill, who is a member of the Board of Governors of the Weizmann Institute of Science, and **Howard Beck** along with their wives, Lee and Trudy, were joined by three other members of the Boston chapter on the study mission to the Weizmann Institute in Israel. He writes, "We spent a wonderful two weeks visiting the Institute, various technological companies in Israel, and the Holy Land itself." He reports that Professor Zacharias, who was also visiting there, joined their group in several discussions. They then went to Bucharest, Roumania, where Bill discussed with the minister of foreign trade Roumania's interest in buying chemical plants in the U.S.A. Bill notes that "the Roumanians are not Slavs, but are very much like the French and the Italians both in language and customs." Bill's current business activities center around the Muskin Manufacturing Company, makers of steel and plastic home swimming pools, and the Harlin M. Buck Company, makers of plastic medical supplies. The two eldest Abramowitz girls, Susan and Gail, are married, Ava is at Goucher College, and the youngest, Kenneth, is at Taft School with ambitions for M.I.T. Bill is already hard at work on our 40th Reunion gift campaign. . . . **Allan Mowatt** calls attention to some hitherto hidden facts about our recently retired Class President, **Leo Beckwith**. In a clipping from the November issue of *Industry Magazine* there are brief portrayals of the newly elected members of the Board of Directors of the Associated Industries of Massachusetts. The brief on Leo states, "Graduate of M.I.T., Mr. Beckwith is president of Market Forge Canada, Ltd.; Morandi-Proctor Company, Inc.; Arrow Metal Products, Inc.; and Mark Industries, Inc., all of Everett. He is a director of the Everett National Bank, past president of the Everett Rotary Club, and past director of the Everett Chamber of Commerce. Now operating five divisions, Market Forge is a national leader in the manufacture of commercial cooking equipment, hospital equipment, storage racks, automotive accessories and sporting goods." In a sepa-



rate note Allan reports that he has been traveling about the country extensively for Astrodyne and expects to continue. He has conducted several seminars on heat sink applications for engineers of large companies. The seminar was published as an article in the November-December 1966 issue of *Electronic Communicator*. . . . Recent news releases in the trade press report that **Bob Flood** has been elected a vice-president of Union Carbide Corporation. Bob has been with Union Carbide since 1935, having started with the Linde Division. . . . Another reports that **J. Goffe Benson** has been appointed president of Union Carbide's Linde Division. Goffe has been with Linde since 1937. . . . **John D. Seaver** has joined Itek Corporation, as director of new business planning. He was formerly with General Electric's Consumer Electronics Division. . . . Professor **Bill W. Buechner** has asked to be relieved of his duties as head of the Physics Department at Tech so he may devote more time to teaching and research, particularly in advanced particle accelerator physics. . . . **Prescott Smith** is now a full professor in mechanical engineering at M.I.T. . . . A clipping from the *Berkeley Daily Gazette* reports the death of **Bernard Friedman** who was a professor of mathematics at University of California at Berkeley. Dr. Friedman had received his masters degree with our class at M.I.T. and his Ph.D. with the class of 1936.

Signs of the times! Perhaps as a result of the data pouring in for the forthcoming reissue of the alumni directory, a mass of address changes has been received for members of our class. For the statistically-minded, changes have been received from 12 per cent of all affiliates of our class, or about 25 per cent of the active members. It seems that not a few of us are far from ready to set roots down. Rather than list all the new addresses, we'll merely give you their names. Please write to Irv Banquer or me to obtain addresses you may desire. However, we expect to hear from each and every one whose name we list. They are Otto Zwanzig, Ewing T. Spering, Rush Lincoln, Walter Green, Brydon Greene, Armand Bartos, Dave Dale, George Forsburg, Henry Ogorzaly, Julius Stern, Tzeng J. Suen, Perry Ware, Bernie Whitman, Franklin Yates, Frank Trifari, John Smyser, Cason Rucker, John Rodgers, Mike Kelakos, Bill Keefe, Paul Gilmont, Lou Garono, Bob Flood, Greg Flint, Edward Edgar, Buckley Crist, Cornelius Wilson, Ken Warren, George Valley, John Ryan, Norris Ruckman, Bill Leary, Charles Hanley, Clarence Goldthwaite, Dick Cook. Also Ned Collins, Bill Brockett, Bernie Berger, Don Wood, John Seaver, Bob Scribner, Bob K. Kennedy, Louis Fong, Art Cohen, Tony Dauphine, Art Linn, and Bud Pflanz. Not to be outdone, your reporter is also making another move. By the time these notes are published I shall be busy on a new assignment at General Electric's Atomic Power Equipment Department in San Jose, Calif. Having left Naval nuclear power for a crack at space, I am forsaking space for commercial nuclear power. The less than twelve months I've spent in space might have taken me to Mars, at today's pace, but it would never have brought me back

to earth. While I make the transition, Irv Banquer will be reporting for you. Please write to him, all of you.—**Ham Dow**, Co-secretary; **Irving S. Banquer**, Co-secretary, 20 Gordon Rd., Waban, Mass. 02168

## '36

When questioned about his change of address reported last month **Elwood Koontz** replied with many interesting tidbits which I include verbatim. "Didn't get to the 30th Reunion because of a conflict with graduation exercises for my oldest daughter—which seemed more vital. Have one daughter, Ginger, presently at Mt. Vernon Junior College in Washington, D.C.; a second daughter, Kathy, expecting to graduate from Hathaway Brown School in Cleveland in June; and a son Ted, who is still in grammar school, and who will either keep me young or make me old before my time. Of course, also a wife Barbara, acquired in my travels, and a new airdale puppy, Reginald. I am probably one of the few still with company of original employment out of Tech. I have seen the Reliance Electric and Engineering Company grow from \$2½ million a year when I started with it to \$150 million, hopefully, in 1967. We seem to be developing a nation of industrial tramps. After stints in sales engineering in Philadelphia, Minneapolis, New York City, Newark, N.J., Pittsburgh and Chicago, I am now at home base in Cleveland as Eastern Regional Sales Manager. We recently moved from Shaker Heights to a big old house in Cleveland Heights where, between planes, I'm busy refinishing antique furniture and raking leaves. I had dinner in Boston a few weeks ago with **Oscar Fick**, who is an electrical engineer with S. D. Warren Paper Company. The week before I had lunch in New York with **Fletcher Thornton**, who is president of the W. E. Greene Company. We just had an announcement of the wedding in Washington of the oldest daughter of Captain **C. Donald Brown**. He was in our class freshman year before transferring to Annapolis. Also had dinner a while back with **Jack Kleinhans** who was also in our class freshman year before he transferred to Lehigh. Jack is presently in charge of chemical operations at General Tire and Rubber Company in Akron. Reliance is loaded with M.I.T. men but no others from our class. Extensive travel has kept me from regular participation in Tech affairs, although I seem to get involved in annual solicitation for the Alumni Fund, last year as area vice-chairman." . . . Dr. **Ed Pratt** writes from Cincinnati where he is currently professor and director of the Department of Pediatrics at the University of Cincinnati College of Medicine, chief of staff at the Children's Hospital, director of the Pediatric Department at General Hospital and director of the Children's Hospital Research Foundation: "Currently most of my efforts are in teaching, administration of research and a department of pediatrics, and research in planning and implementation of innovations in providing health services for children." Previously Ed

taught at N.Y.U. and the University of Texas Southwestern Medical School. . . . **Elliott Robinson** asked that his mail be sent to his business address—United Shoe Machinery Corporation, Room 900, 140 Federal Street, Boston 02107—so he would get it faster when he was summering away from Hanover. He reports on his trip last spring and I share parts of it with you here: "Briefly our trip covered three months. The *Christoforo Colombo* left Boston in late February touched at Spain, Naples, Palermo and Messina. We disembarked at Piraeus for Athens where we had our only reservation. Our impressions were so different from much that we had read that it would take pages to cover. Our rate of progress was such that we saw peach blossoms from southern Italy up through Brussels and into England. We worked through the Alumni Office as a member of the Alumni Council and were fortunate enough to make fascinating contacts with Alumni in Milan, Paris, Brussels and London. Sam Groves, president of the Alumni Association then, was in London at the same time. The London M.I.T. Club invited our wives and us to a splendid dinner where Sam gave a capsule view of the new M.I.T. which essentially introduced the slides the Association gave me to show. The open discussion following the speech and slides showed the continuing lively interest Alumni retain in Europe. This had already shown up in the real interest even the one-year graduate students had shown in all my previous contacts. Of course, I visited all of the United Shoe Machinery plants in Milan, Zurich, Paris and Leicester. I learned a great deal about our truly International Company. (We have, and have had for many years, more than twice as many employees outside of the U.S.A. as inside.) We went back to Naples from Athens via the Corinth Canal, the Adriatic and Brindisi. Then Rome, Florence, Pisa, Milan, Venice, Zurich, Lucerne, Lausanne, Paris, Brussels, Dover, London, Canterbury, Leicester, Southampton and home on the *Statendam* via Halifax, N.S. We found the time passed all too quickly. We were a little at a loss to see how so many cover even more than we in even a shorter space of time. There was so much that we wanted to see but could not seem to cover. We have started right now to save up for another trip. Several places we want to return to and many other places we want to see. Betty and I were delighted to see so many of our old friends at the 30th Reunion—but—many familiar faces were missing. In fact so many were missing that I was cornered into being Class Agent. Please make my job easier by responding generously and early to the Alumni Fund appeal—student housing and other needs are great as are scholarships, etc. As I pointed out in a recent letter, '36 is among the tops in number and percent of contributors, but kind of low in total dollars. With thirty years behind us—tough though they were—our M.I.T. experience certainly gave us something different to remember and rely on technically and generously! P.S. We found one interesting item that we would like to share with you. We have to scoff at Eu-

rope on \$55 a Day, but only from the \$ standpoint. It gave many excellent descriptions of points of interest and pointed out many things we would not have seen had we relied wholly on the usual guides."

'36ers on the move include **Col. Gerald S. Chapman** to Greensboro, N.C. (1708 Friendly Road 27403); **Al Gray** to Genova, Italy—Via Del Lago Pineta, Arenzano; **Robert Haynes** to Lake Wales, Fla., (Rt. #2, Box 2049, Timberlane 33853); **Ernest Murray** at 19090 Portos Drive, Saratoga, Calif. 95070; **Norman Robey** at American Oil Company, 910 S. Michigan Ave., Chicago 60605; **William Royce** to 1453 Ohialoke Street Honolulu, Hawaii 96821; and **Mrs. Theodore C. Swartz** (Ethelyn Trimble) to 142 Coral Circle, South Daytona, Fla. 32019. **Loreto Lombardi** is back in Groton, Conn., from California. His address is 196 Tyler Avenue (06340). **Bill Canning** has moved to San Marino, Calif., (689 S. Santa Anita Avenue 91108). The other fifteen address changes reported to me by the Alumni Office are zip code additions which you can make on your own address lists by journeying to the post office and looking them up!—**Alice H. Kimball**, Secretary, 20 Everett Avenue, Winchester, Mass. 01890

## '37

**Irving W. Tourtellot** has been appointed southern district manager of Charles T. Main, Inc., a Boston engineering firm. Main, one of the largest engineering organizations in the U.S., provides study, design and construction management services in twelve or more fields. Irv joined Main in 1956. He previously operated his own engineering firm and is a past vice-president of Crandall Dry Dock Engineers, Inc., in Cambridge, Mass. He is a member of the National Society and the Professional Engineers of North Carolina, a fellow of the American Society of Civil Engineers, vice-president of the North Carolina Section of A.S.C.E., and chairman of the A.S.C.E. National Committee on Local Sections. . . . **Harry B. Goodwin** is a lt. col. with the 239th R&D Unit, Columbus, Ohio, and is a metallurgical researcher at Battelle Memorial Institute. . . . **Phil Jacobs** is technical assistant to the president of the Chase-Shawmut Company, Newburyport, Mass. Upon graduation from M.I.T. he joined the Allis-Chalmers Manufacturing Company, Boston, Mass., where he remained until 1942. From 1942-1945 he was a research associate, radar power supplies and systems, with the M.I.T. Radiation Laboratory. In 1945 he joined the Chase-Shawmut Company. Phil holds 15 patents in power fuses and fuse application. . . . **Phil Peters**, our class President, has been elected a senior vice-president in group sales and service of John Hancock Mutual Life Insurance Company. Phil joined the John Hancock group annuity sales division in 1938 and was promoted to manager of the division in 1943. In 1946 he was promoted to director of group sales and service. He was elected second vice-president in 1950 and vice-president in

1956. He is president of the Boston Rotary Club, also vice-president of the M.I.T. Alumni Association, chairman of the M.I.T. Alumni Fund Board and is M.I.T. education counselor for Wellesley High School. . . . **Dick Young**, chairman of our 30th reunion, has appointed the following committee chairmen: **Joe Heal**, finance; **Bob Thorson**, publicity; **Ralph Webster**, registration; **Karl Goodwin** and **George deArment**, sports; **John Nugent**, banquet; **Leo Moore**, liaison; and **Len Seder**, statistics. The reunion committee has met, and plans are well under way for a glorious time, with fun as the keynote, at the Oyster Harbors Club, Cape Cod, from June 9 through June 12. You will be asked in the very near future, to indicate your plans for our 30th Reunion. We hope your answer will be "Yes, I am coming!"—**Robert H. Thorson**, Secretary, 506 Riverside Ave., Medford, Mass. 02155; Professor **Curtiss Powell**, Assistant Secretary, Rm. 5-325, M.I.T. Cambridge, Mass. 02142; **Jerome Salny**, Assistant Secretary, Egbert Hill, Morristown, N.J.

## '38

Sort of thin on attendance at Alumni Day 1966, the Class of 1938 nevertheless did manage some most stimulating conversations! The luncheon group included the following: **Lou Bruneau**, **John Glacken**, **Selma** and **Tom Garber**, **Art Gold**, **Bob Johnson**, **Fred Kolb**, **Geraldine** and **Dave Morse**, **J. J. Phillips**, **Regina** and **Ash Shapiro**, **Milt Wallace**, and **Al Wilson**. We were of course bolstered by **Don Severance** at the head table, where he had been entrusted with providing adequately for Mrs. Compton, Mrs. Killian, Mrs. Stratton, and Mrs. Johnson! At the evening dinner our group had become: **Lou Bruneau**, **Tom** and **Selma Garber**, **Fred Kolb**, **Dave** and **Geraldine Morse**, **Don** and **Phyl Severance**, **Milt** and **Carolyn Wallace**. . . . Reading now from the hasty notes of those encounters, here are a few items straight from the participants! **Tom Garber**, who describes his technical interest as "sensor-type transducers," at the Sanborn Division of Hewlett-Packard, still lists the family and transducers as most important. The family has brought him into activity with the Boy Scouts, and you know what his involvement at Hewlett-Packard has produced. . . . **Milt Wallace** is expecting to retire from the Army Corps of Engineers, with whom his most recent assignment has been at headquarters, USCONARC, Fort Monroe. It is not yet sure which of the glamorous activities will now become his first choice! . . . "After twenty-eight years," **Art Gold** observed toward the close of the luncheon program, "the administration of the Institute hasn't changed much!" . . . **Bob Johnson** confesses to an Ivy League involvement, with their twins, **Kath** and **Phil**, graduating from Wellesley High School and headed for Mt. Holyoke and Princeton respectively. . . . **Al** and **Carol Wilson** had just returned from two weeks in Italy and Spain, celebrating their 25th wedding anniversary. "Our oldest, **Ray**, is out of the Marine Corps, back at the University

of Penn., and married. **Anita** graduated from Garland Junior College this week, while **Sarah** graduated from high school. **Mark** is a high school sophomore." . . . "I am just finishing my first year as head of the M.E. Department at M.I.T.," **Ash Shapiro** reports, "and am struggling to retain my identity as a professor. I've turned my researches in the direction of biomedical fluid mechanics, and am trying to learn something about physiology." Those of you who have seen **Ash's** theatrical successes in the P.S.S.C. films may therefore look forward to his debut on "Medic." **Ash** and **Regina** have three of their five children in college this year: **Berkeley**, **University of Chicago**, and **Lake Forest College**! "Last fall I was lucky enough to receive the Worcester Reed Warner medal of the A.S.M.E.," **Ash** continued, "for contributions to the permanent literature of engineering. On the side I'm working with the Technion (Israel Institute of Technology) on the development of their Mechanical Engineering Department." . . . **Lou Bruneau** commented on his monotony-breaking schedule: "I see bachelor **Bert Grossel-finger** from time to time at the Chemist Club in New York. **Jean** and **Ed Hadley** were at our home a few months ago; **Ed** is still the same calm, pipe-smoking mainstay of Ma Bell. I am now on a three-day weekend schedule in lieu of vacation—commuting all summer long between New Jersey and East Orleans on Cape Cod. Stop in—if you can catch me in between golf and boating and beach bugging." . . . "We've had two citations," announced **Dave Morse**, "for our Housing for the Elderly projects—both State and PHA aided—and we certainly keep busy." Associated with **William Hoskins Brown**, '33, from the Faculty of the M.I.T. School of Architecture, **Dave** claims to be involved in the general practice of architecture. "Architecture is hectic, but it has compensations. I'm supervising an apartment project we designed for Vineyard Haven, and the trip over and back is a welcome relief from the daily telephone calls!" **Dave** and **Geraldine's** older daughter, **Ruth**, is now a freshman at Lake Forest.

**Hal Cude**, who was most recently in the U.S.A. instructor unit at Georgia Tech, has retired from the Army and is teaching at the University of Nevada. . . . Just to add a little perspective, **John Sullivan** has written a further architectural note: "I read with great interest the happenings of the class of '38. Having been a graduate student, I suppose, is one of the reasons I seldom see anything about the men I knew in the School of Architecture at that time. It might interest some of them to report my most noteworthy honor: re-election for the tenth one-year term as president of the Board of Trustees of the Dayton Art Institute. This will absolutely be my last term. Otherwise I fear they will want to either hang me on the wall or keep me in one of the glass cases! Among other things we have just built a new house deep in the woods and are enjoying our first summer in it. My older daughter who will be a junior at Wells College is spending the summer traveling in Europe. My younger daughter leaves



for summer camp next week, and all of this is slightly ironical since we no sooner get a larger house than everyone takes off! . . . **Paul Black** reports, "News is very skimpy. Aside from seeing Don Severance and Lou Bruneau at the Alumni Council meeting, I haven't seen any '38ers for some time. But here is a note from *Electronic News*: "**Lloyd Bergeson** has been elected chairman and chief executive officer, Vacuum Barrier Corporation, Woburn Mass., producer of cryogenic vessels and equipment. Mr. Bergeson who has been a director of the company since 1965, is an independent industrial management consultant in Noank, Conn.'" . . . And now we can add another filip to the Course XIII news, with a note from **Bill Gibson**, apparently transcribed from his diary: "March 1965: ruptured Achilles tendon playing tennis in Arica, Chile; hospitalized three months in Panama. September 1965: left La Paz enroute Hawaii. October 31, 1965: retired from Foreign Service. February 1, 1966: Married Dora Tellez from La Paz in South Carolina; settled in Washington, D.C. to study for a Ph.D. Economics with Dora, an MG, and a 42-ft. diesel boat!" . . . Caught up in the esoterics of the solid state, I found **Frank Gardner** and **Al Clogston** at the Conference on Magnetism and Magnetic Materials, November, in Washington. Both of them had been at an earlier conference in Stuttgart during June, but since collecting material for the class notes does not justify a very large expense account, I had not been there to check up on them! With their sons Dick, teaching English near Detroit, Jim, applying to med school, Dave, a prep school senior, and only Tom at home, Frank reported that "E" has been working on an M.S. from B.U. in education, specializing in remedial reading. So great is the demand, however, that she is already teaching two special classes in Framingham, and therefore those studies at B.U. don't really come during spare time! . . . **Al Clogston**, Director of Physical Research Laboratory at Bell Labs, Murray Hill, was chairman of the session entitled, "Kondo Effect; Hyperfine Fields in Metals." He is the leader of a research group on magnetic materials at Bell and has just been appointed to the M.I.T. Physics Department Visiting Committee. One discussion theme at the Conference was the proper role of basic research and the provision of adequate financial support. The three of us explored the subject, with Al contributing the designations "intellectually guided" and "economically guided" research—the "intellectually guided" being the category currently suffering. Rededication, however, calls as a prerequisite for a careful analysis of the interrelations among the various research, development, engineering, manufacturing, and use disciplines. Have we thought clearly how much "intellectually guided" research we actually need for reasonable balance? How many of us, Al asks, have thought out a logical presentation to a congressman on just how fundamental research fits into the complexities of what may become a new commercial success? Where should such "intellectually guided" research be done, and with what funds?

O.N.R. is currently examining its own role in fundamental research, Frank pointed out, and seeking a clearer definition of what it can best do in the world of science. Unfortunately we don't expect an answer by the time this comes from the press, but hopefully each of us can help and nurture a little more progress toward a science apology (Webster: "something said or written in defense of what appears to others to be wrong!") . . . Regretfully we note three deaths, and confess that we have no fitting remarks in amplification at this time: **Edward K. McGill**, 3rd, of West Acton, Mass. (no date); **Maurice B. Gordon** of Baltimore Md., on July 25; and **Walter W. Landsiedel** of Shreveport, La., on October 12. . . . Have you been keeping track of June 1968? Have you reserved the weekend of June 7-10 for our 30th?—**Frederick J. Kolb, Jr.**, 211 Oakridge Drive, Rochester, N.Y. 14617

## '39

**Harold Chestnut**, VI-A, wrote a short note of greetings this month and enclosed a news clipping which said in part: "Dr. Harold Chestnut, manager of the systems engineering and analysis branch of the General Electric Research and Development Center, has been elected to serve as a member of the delegate-at-large/director-at-large board of the Institute of Electrical and Electronic Engineers from 1967 to 1969. Dr. Chestnut is a Fellow of the IEEE and has served as chairman of numerous IEEE committees, particularly those dealing with feedback control. He was a founder and first president of the International Federation of Automatic Control, and is currently chairman of the IFAC systems engineering committee. He also has served as president of the American Automatic Control Council. He is the author of several books, the most recent of which is *Systems Engineering Tools*. Mr. and Mrs. Chestnut and their three sons live at 1226 Waverly Place, Schenectady, N.Y. 12308. From a separate source came the news that Hal had received an honorary degree of Doctor of Engineering from Case Institute of Technology in June of 1966. . . . **Lawrence M. Lyons**, VI, also wrote an informative letter. (This month I hit the jackpot; such response from '39ers is unusual, but most welcome!) Larry is manufacturing manager at Burndy Corporation, Norwalk, Conn., producers of electrical connectors (if my memory is correct). "During the past two years, like my colleagues in the manufacturing fraternity elsewhere, I have been struggling to keep up with incoming sales." He also wrote that in August he and his wife vacationed in Guatemala as the guests of Dr. and Mrs. Rodolfo E. Herrera ('38, Course VII). Rudy received his medical degree at Harvard following biology and public health studies at M.I.T., and then spent several years at Massachusetts General Hospital as a resident in surgery. Rudy is now one of the leading physicians in Guatemala. Larry's home is 41 High Point Road, Westport, Conn., 06880. . . . **Seymour J. Sheinkopf** and I, as co-class agents, each

received a reply to the October Class Agents' letters from the office of the Department of Natural Resources, Province of Quebec, updating us on the death of Dr. **Paul E. Pelletier**, VIII. An attached clipping from *Northern Miner*, January 26, 1966, stated that Dr. Pelletier had died in Quebec City. He had been director of the pilot plant of the Quebec Department of Natural Resources since 1958. . . . **Frederick B. Grant**, XV, investment advisor, at Box 186, Wellesley Hills, Mass. 02181, sent along two clippings. From the *Boston Herald* of June 23, 1966, came the announcement that Dr. **Maurice A. Meyer**, VI, had been named a vice-president of the Laboratory for Electronics. Maury had previously been chief engineer of L.F.E. Fred's other clipping was from the *National Observer* of November 28, and it may be a surprise to **Richard S. Leghorn**, VIII, to find his name in this column. The *Observer* article was entitled "Why Companies Insure Key Men for Millions," and it informed us all that Dick, as president of Dasa Corporation, has been insured for \$1,000,000 with an annual premium of \$34,900. Dick's present connection, Dasa, is a maker of automatic dialing devices for the Bell System, and is located in Andover, Mass. And thank you, Fred!

PHOTO: H. CAMPBELL

Elmer F. De  
Tiere, Jr., '39



Having reported last month on the current activities of **Harold R. Seykota**, XV, in Peru, I'll simply acknowledge with appreciation his Christmas letter full of family news of Hal, Hilda, Ed, and Susan; any of you who wish may write me for a photocopy. . . . Not having received any Boston papers at election time, I'm a little late on this one, having been posted this month by the Alumni Register: Congratulations to **Francis W. Sargent**, IV. Frank is the new Lieutenant Governor of the Commonwealth of Massachusetts! . . . **Elmer F. DeTiere, Jr.**, XV, has been appointed to assistant chief engineer of the Rochester Products Division of General Motors Corporation. Pete and his family live at 19 Tyringham Road, Rochester, N.Y. He joined Rochester Products Division in 1955 as a project engineer, and has had a variety of engineering responsibilities ever since. . . . **William S. Brewster**, II, President of United Shoe Machinery Corporation, Boston, Mass. 02107, found time in a busy schedule to send a note as follows: "A business trip early in the year to the Far East including Japan, Taiwan, Hong Kong, Australia, and New Zealand, and a few days at Tahiti on the way home. Salmon fishing trip to Gaspe in July. Another fishing and whaling trip to Hudson Bay at the end of that month, collecting a beluga whale via harpoon. Camping trip with family to

Nova Scotia and New Brunswick in August. Elected this fall to Executive Committee of M.I.T. Corporation. Review of anti-trust case and corporate organization occupied big portion of time this year."

—**Oswald Stewart**, 3395 Green Meadow Circle, Bethlehem Pa. 18017

## '40

This month's column may appropriately be called "News in Brief." **Bob Davis** is the new general manager of Hooker Chemical Corporation's International Division. Prior to joining Hooker in 1962, Bob was manager of International Chemical Operations for F.M.C. Corporation. . . . **Ed Di Giannantonio** is now manager of market development in Raytheon Company's Submarine Signal Division, Newport, R.I. Prior to joining Raytheon, Ed had been director of A.S.W. and Oceanography Marketing for Bunker Ramo Corporation. . . . From Oz Stewart, Secretary of the class of '39, comes the very appreciated clipping advising that **Joe Libsch** has been honored by being awarded an endowed professorship, funded by a \$100,000 gift from the Alcoa Foundation to Lehigh University. Joe is chairman of the Department of Metallurgy and Materials Science and director of the Materials Research Center at Lehigh. He has been a member of the Lehigh faculty since 1946.—**Alvin Gutttag**, Secretary, Cushman, Darby & Cushman, American Security Building, Washington, D.C. 20005

## '41

**Hank Avery** received and forwarded to us the following letter of appreciation from Marjorie Stewart, wife of **Carlton Stewart** whom you will remember having seen enjoying from a wheelchair the 25th Reunion activities: "Carlton and I should like to express our thanks through this column for the many, many acts of kindness and helpfulness shown to us during our stay at the 25th Reunion. We, as well as our two children, enjoyed ourselves immensely. How very wonderful it was for Carl to see and hear so many things that otherwise he might not have if there had not been so many willing hands (and I might add, sturdy backs!) to help get him in and out of the various buildings. We are so very appreciative." . . . **Richard F. Cottrell** has been promoted to vice-president of solid rocket operations of Aerojet-General Corporation. He will be responsible for all solid rocket activities at the Sacramento plant and at the Dade division near Miami, Fla. He joined Aerojet in 1956 and has been directing the company's development program on the 260 inch diameter solid rocket motor for the National Aeronautics and Space Administration. Previously, he had been in charge of the design, development and production of second stage motors for the Air Force Minuteman. . . . **Raymond G. O'Connell**, Director of Marketing for the Torrington Company, Torrington, Conn.,

spoke on "Marketing Problems of the Innovators" at the November meeting of the Hartford Chapter of the American Marketing Association at the Hotel America in Hartford, Conn. He joined Torrington Company in 1945 as a sales trainee, later moving up to management of the firm's Chicago and Detroit district bearing sales offices. In 1955 he was transferred back to the home office to assume the post of assistant sales manager, Bearings Division. In 1957 he became sales manager and was named director of marketing this year. **Alfredo M. Pedraza** has been named sales manager of Industria Colombiana de Llantas, S.A., a subsidiary of the B. F. Goodrich Company, located in Bogota, Colombia. Alfredo is a native of Cuba and joined B. F. Goodrich in 1941 as a technician for Goodrich Cubana, S.A. He held several sales positions with that company before being named to the Bogota, Colombia assignment. . . . **Dr. Henry Faul** has been appointed professor of geophysics and chairman of the Geology Department at the University of Pennsylvania. He had been professor of geophysics since 1963 at the Southwest Center for Advanced Studies, Dallas, Texas. Born in Prague, Czechoslovakia, he attended that city's Real Gymnasium until 1939. After his B.S. from M.I.T. in 1941 he obtained an M.S. degree from Michigan State University in 1942 and a Ph.D. from M.I.T. in 1949. From 1943 to 1946 he was connected with the Manhattan Project and from 1946 to 1949 served as a research associate in nuclear geophysics at M.I.T. In 1950 he became chief of the U.S. Geological Survey's radiation laboratory in Denver, Colo. In 1954-55 he was visiting professor of geophysics (as a Fulbright lecturer) at the University of Strasborg, France. From 1955-1963 he was with the Geological Survey and the Carnegie Institution, Washington, D.C., and also served as visiting professor at the University of Bern, Switzerland, as a National Science Foundation Postdoctoral Fellow. Among the books he has authored are *Nuclear Geology* (1954) and *Ages of Rocks, Planets and Stars* (1946). He is a member of the Geological Society of America, the Geochemical Society, the American Geophysical Union and the American Association for the Advancement of Science. . . . **Dr. Charles H. Townes** is co-author of an article in the September issue of *Physics Today* urging basic changes in the 23,000 member American Physical Society's constitution to make its officers and policy-making body more representative of the membership and divisional structure. While it looks like a hard fight ahead for Dr. Townes, we feel confident that he is equal to the task. Please address class news items to—**Walter J. Kreske**, Secretary, 53 State Street, Boston, Mass.; or **Everett R. Ackerson**, Assistant Secretary, 16 Vernon Street, South Braintree, Mass.; or **Michael Driscoll**, Assistant Secretary, City Hall, Nantucket, Mass.

## '42

As most of you are aware, I have to write these notes about two months before they

appear in print. Therefore, by the time you read them many more things will have happened concerning our reunion than I have noted here. This might come as a surprise to you, since so much has already happened. As you know, we are going to have our reunion at Baker House on the M.I.T. campus. We have talked to a number of classes who have done this, and it turns out that without exception every class that has had its 25th reunion at Baker House thoroughly enjoyed having done so. Let me tell you about some of the features. Registration will begin Friday, June 9. Limited accommodations will be available at Baker House Thursday evening for those arriving from a distance. Our reunion, then, will be Friday evening through the following Sunday evening with Alumni Day activities all day and evening Monday. Children of all ages are welcome to the reunion, but parents will be encouraged to know that when the children arrive with their parents, they will be immediately taken away and divided into age groups and engaged in an extraordinarily full program run entirely by the M.I.T. Athletic Department Counseling Staff. Every sport activity will be available to them, with the exception of, I suppose, crew. There will be swimming, baseball, tennis, sailing, archery, etc. In the evening there will be dancing for the high school and college kids; movies, ping pong, etc., for the smaller ones. Past classes have had a third of the children less than 13, and about a third in the 18-22 age group. Apparently no children less than 4 have turned up, so here is the chance for someone to set a record. Also it is interesting to know that **Lou Rosenblum** reports that in the first fifty biographies he has reviewed for our Anniversary Book he has found three grandchildren. **Carl Zeitz** has accepted the job of being counselor to the children. This really means he has some responsibility for the overall planning of the activities. Those of you who know Carl know that the children will have a real swingin' time, and any of you who have older children might induce them into coming by telling them that Carl plans to bring his teenage daughter who is a model (she must favor her mother). For the adults the number of activities planned is too overwhelming to report here. We have such things as a talk by Colonel **Dick Gibson**, who has something to do with all the NASA shoots and who will bring spectacular films of missiles exploding on the pad and other unusual events which we seldom hear about. We might well have the children join us for this. Then we will have certain demonstrations and discussions by carefully selected Faculty (this might sound dull, but I will guarantee it won't be). We are going to have a reception at President Johnson's followed by a luncheon to which will be invited the Faculty who taught us, many of whom are now of course retired. We shall have a dinner-dance. We are going to spend a day at the Essex Country Club with a clambake and the conventional softball game, golf, etc. Incidentally, for this activity we request that any of you who can use them effectively bring musical instruments. I don't know yet what the price



will be, but it is interesting to point out what is being provided free by M.I.T. M.I.T. gives us the dormitory facilities, free breakfasts, the luncheon where we entertain our former Faculty, the reception at the President's, all the athletic facilities, and a subsidy of about \$10 per head for Alumni Day.

Finally, I should make a plea for those of you who have not as yet sent in your biographies for our Anniversary Book, and another plea for advertising in the book, with full page ads going for \$100, half-page ads for \$50, and progressively less down to business card size for \$10. See you at the reunion!—**Jack Sheetz**, 45 Rutledge Rd., Belmont, Mass. 02178

## '44

**Dr. Albert B. VanRennes**, 13 Center Road, Old Greenwich, Conn., has been appointed technical director of Bendix International. After completing his undergraduate work at M.I.T., Albert continued on at M.I.T. for his doctorate in Electrical Engineering. He then served on the Faculty of M.I.T. as Associate Professor of Electrical Engineering. In 1956 he joined the staff of Bendix' Research Laboratories Division in Southfield, Mich., where he headed its Nuclear Technology Group. From 1959 to 1961 he was vice-president (physical sciences) of United Research, Inc., Cambridge, Mass. In 1961 he rejoined Bendix and has served as director for European scientific and technical liaison until being appointed to his present position. . . . **Dr. Mario D. Banus** (see January notes) has written an article which appears in the September issue of the *Journal of Applied Physics*. . . . **Paul Heilman** writes that **Tom Lawson** recently made a presentation to the Marketing Seminar of the M.I.T. Club of New York. Paul called Tom and learned that Tom is systems manager, Small Commercial Systems, IBM Data Processing Division, White Plains, N.Y. Tom has been with IBM for 16 years, and has lived up and down the East Coast. In his travels he has encountered **Warren A. Bishop**, Darien, Conn., and **Jules L. Lobsitz**, Upper Montclair, N.J. On a recent trip to Boston Tom saw **Robert A. Plachta**, Wellesley, Mass. Last year he had occasion to be in Reading, Pa., where he had a long chat with **William H. Schlegel**, Wyomissing, Pa. . . . Paul says that there has been quite a resurgence of interest in the M.I.T. Club of New York and that one of the programs that is being reestablished is the class luncheon. Paul has volunteered to get a class luncheon started and says he will doubtless have one in February 1967. Anyone interested in attending should call Paul in New York City (see end of notes for telephone number). . . . From the club news section of the November Review we note that **E. Alfred Picardi**, Highland Park, Ill., formerly vice-president of the M.I.T. Club of Chicago, was elected president at a meeting last June. **Lewis Tyree, Jr.**, was reelected secretary. Congratulations, gentlemen. Would you consider using your good offices to arrange

for a flow of news regarding classmates in the Chicago area? Can you recruit a local correspondent? . . . Continuing in this same vein we note from the 1965-66 Directory that **W. Parlin Lillard, Jr.**, 6055 Park Road, Cincinnati, was president of the M.I.T. Club of Cincinnati for 1965-66. **Bruce A. Lamberton** was vice-president of the M.I.T. Association of Cleveland; **Bernard J. Duffy, Jr.**, was president of the M.I.T. Club of Kansas City; **Lee C. Eagleton**, Moorestown, N.J., was vice-president of the M.I.T. Club of Delaware Valley (Philadelphia, Pa.); and **Gilman Y. Murray**, Los Altos Hills, Calif., was vice-president of the M.I.T. Club of Northern California. A 1966-67 Directory should arrive any day which will permit an updating of the above list. . . . Last October I wished all of you a merry Christmas. Now as I turn to help China with our Christmas cards, may I wish all of you a Happy Valentine's Day, and from the capitol city, a happy George Washington's Birthday.—**Paul M. Robinson, Jr.**, Secretary, Navy Department Program Information Center, Pentagon 4D683, Washington, D.C. 20350, 202-0X5-0351 or 7710 Jansen Dr., Springfield, Va. 22150, 703-451-8580; **Paul M. Heilman**, 2d, Assistant Secretary, Copper Development Association, 405 Lexington Ave., N.Y., N.Y. 10017, 212-867-6500 or 30 Ellery Lane, Westport, Conn. 06880, 203-227-3469; **John G. Barmby**, Assistant Secretary, IIT Research Institute, 1200 17th St., N.W. Washington, D.C. 20036, 202-292-1610

## '46

**Dr. Mac Van Valkenburg**, formerly of the University of Illinois, joined the Princeton University Faculty in July. He is presently chairman and professor of the Department of Electrical Engineering. This should prove to be a very satisfying and stimulating change, as he has been with the University of Illinois for eleven years as the associate director of the Co-ordinated Science Laboratory. . . . **Dr. Roger Hickler** presented to New York's American Heart Association a most vital and interesting report which was described at the Harvard Medical School on October 22nd. This scientific session concerned an important blood vessel constricting substance, renin, which can be isolated from single human blood donations. Renin is an enzyme which works on an alpha-2 globulin, and eventually produces the most potent vasopressor substance known. This substance, angioten-

Albert B. VanRennes, '44; Robert E. Day, '48



sion, is thought to be closely connected with high blood pressure. Research has found a naturally occurring renin inhibitor in normal blood plasma, and all efforts are being made to isolate this inhibitor. . . . **David Sherrick** has been named the director of market research and product planning for Rixon Electronics in Silver Spring, Md., which is a producer of digital and analog data transmission equipment. . . . **Henry Viola** has been named vice-president of Reeves S.P.A., Milan, Italy. This should be a wonderful opportunity, not only occupationally, but linguistically, also. He was formerly located with Reeves in Buena Vista, Virginia. . . . **Tom Malone** was recently named vice-president and director of research at the Travelers Insurance Companies, Hartford, Conn. . . . **Melvin Zisfein** has been appointed associate director of the Franklin Institute Research Laboratories, Philadelphia, Pa. This new post will involve the planning, acquisition, and coordination of new research programs in the various technologies of interest to the Laboratories. . . . **Roger Drexel** is moving up with Du Pont; he was named director of the Manufacturing Division of the Industrial and Biochemicals Department. . . . **Alexander Oszy**, an ardent bridge player and professional "bridge businessman", finally gave himself a rest, and his wife the biggest break in her life, said the newspaper clippings, when he returned to Raytheon as an electrical engineer. . . . **Fred Ross, Jr.** was recently appointed president of Tysman Machine Company, Knoxville, Tenn. His main objective is maximum efficiency, so obviously, Tysman will never suffer a loss of business. . . . **Walter Backofen's** name has been mentioned in more papers and magazines than he has time to read; he is largely responsible for the surge of interest among metallurgists in the phenomenon of "superplasticity," a condition of low, even vanishing strength in a material. It seems that Walter Backofen is going to be kept frantically busy for quite a while. . . . **Dr. Howard Taylor** is now involved in working to program die casting machines for the different alloy systems to produce the desired solidification patterns and avoid gross porosity. Let's keep the class of '46 an outstanding one, so continue to forward any items of mutual interest.—**Donald A. Hurter**, 40 Fisher Street, Norwood, Mass.

## '48

Once again I sit here writing these notes early in December, frustrated by the fact that you will not read my Season's greetings and best wishes for the New Year until sometime in February. At any rate, here's wishing that by the time you read this you will have had a merry Christmas and will be starting out on an adventurous and happy New Year. In the report on the 1966 Alumni Fund we read that the class of 1948, with 44% participation, was one of four classes 24 years or less graduated listed under the heading, "The Leaders," as far as highest % participation is concerned. Maybe in a few years we'll make

the "Largest Amounts" group. . . . **R. Clark Dubois** has been appointed chief engineer of the copier products engineering department of Pitney-Bowes, Inc. Clark joined Pitney-Bowes in 1963 and was appointed technical assistant to the director of development and design in 1965. Most recently he was chief engineer for design research. His home is in Fairfield, Conn. . . . **Bascom W. Birmingham** was one of 19 Science and Technology Fellows selected in September by Secretary of Commerce John T. Connor. This is the third year of a successful program in professional development of scientific and technical personnel in the federal service. The fellowship program is conducted in cooperation with the Brookings Institution. Those selected will spend approximately a year in training and in jobs which will broaden their perspectives and enhance their qualifications. . . . **Frank J. Heger**, consulting engineer, Simpson, Gumpertz & Heger, Inc., was one of the lecturers in a series entitled "Space Forms in Steel" which took place in October and early November at Cohen Auditorium, Tufts University, Medford. Four lectures reviewed the development of unusual roof structures in steel as well as providing a booklet of design examples suggesting numerical approaches to the analysis of such structures. . . . **Dr. G. W. P. Rengstorff** was appointed early this fall to departmental technical forecasting within the Department of Process and Physical Metallurgy of the Columbus Laboratories of Battelle Memorial Institute. . . . **John M. Randolph** is president of Randolph Computer Corporation. The company, which commenced active operations in September 1965, leases IBM System/360 computers to major corporations. . . . **Marty Billett** of 16 Greenwood Avenue, Barrington, R. I., assistant director of research at the Fram Corporation, Providence, has been appointed Special Gifts Chairman for the Providence area for the 1966 Alumni Fund campaign of M.I.T. In addition to the above duties, Marty is a member of the Barrington Highway Commission, the Rhode Island Academy of Science, and a consultant to the Radiation Accident Team at the Roger Williams Hospital. He teaches radioisotope applications at the Extension Division of Brown University. . . . **Glenn W. Stagg** heads the Engineering Analysis and Computer Division of the American Electric Power System Service Corporation. This company is using a huge digital computer in a wide variety of applications relating to system design and operation, economic evaluation, plant and equipment design, and load forecasting. These studies include programs that simulate load flow and permit modeling of short circuit effects for planning and relaying purposes. It is reported that models of transient stability situations for as many as 20 large power systems have been evolved. The new computer is also being utilized for investigation of distribution circuit load flow patterns. The A.E.P. engineers are also using the computer in transmission tower design and placement and in line sagging and tension studies. This is the second novel computer installation on the A.E.P. system. In December

1964 the system installed a \$6-million computer complex in the Canton, Ohio, headquarters of Ohio Power Company. . . . **Arthur W. Brusila** has been named manager of Project Leap Frog at the Pittsfield plant of the General Electric Company. This project is aimed at putting equipment for electricity distribution underground. . . . **Dwight E. Norris** has been appointed production manager by Charles Pfitzer & Company. He had been department head of the antibiotic recovery department. He resides with his wife and three children at 271 Eastern Point Road, Groton. . . . **Alexander W. Coombs** has been appointed manager, production services, on the corporate manufacturing staff at United States Envelope in Springfield. He will directly supervise the activities of the production group and will be responsible for continuing the development and implementation of plans and programs to meet the company's manufacturing cost-reduction objective. . . . **Robert E. Day** has been promoted to manager of the Pittsburgh branch sales office of the Foxboro Company. He was previously marketing manager of the company's Van Nuys, Calif., Division. He joined Foxboro in 1959. . . . **Dr. Albert J. Kelley**, deputy director of the Cambridge electronic research center of NASA, has been made a fellow of the Institute of Electrical and Electronic Engineers, an honor conferred for outstanding achievement. . . . An article entitled "Traffic Engineering in Cincinnati" in the October issue of *Traffic Engineering* cites **John D. C. Little** as one of the developers of a computer program to determine optimum cycle length and offsets for progressive signal timing and maximum band width. John, I hope you will soon get to work on some of my favorite traffic lights! . . . **John Tillett, Jr.**, and family decided to put a pool in their back yard at 241 Huntley Place, Charlotte, N. C., and to cover it so they could use it year-round. No suitable cover could be found in all the Carolinas, but on a trip to California he found just what he wanted. He was so impressed with the cover that he applied for the distributorship in North and South Carolina! John is president of Tillett Chemical, Inc., of Pineville.—**Robert R. Mott**, Secretary, Kent School, Kent, Conn.; **John T. Reid**, Assistant Secretary, 22 W. Bryant Ave., Springfield, N. J.; **Richard V. Baum**, Assistant Secretary, 1718 E. Rancho Drive, Phoenix, Ariz.

## '49

**Herb Spivack** was the subject of a feature story in the *Cranston* (R. I.) *Mirror* which describes the phenomenal growth of Mereco Products (Division of Metachem Resins Corporation) which he founded in 1961. Herb specializes in the development and manufacture of epoxy resins which are widely used in industry. One of these is used as an adhesive for Teflon while another is used to coat printed circuit boards used in the Side Winder missile. Herb's 1965 sales were double those of 1964 and sales for the

first three months of 1966 equalled 1965. The Spivacks, wife Gloria, daughter Elaine, and son Robert, lived at 10 Pilgrim Drive in Cranston at the time of our 15th reunion. . . . **Eric Howlett** is the president of Numex Corporation of Waltham, Mass. He is starting to market a numerical display device which can be held in the palm of the hand and which will project large, clear numbers (0 through 9) on a small screen at the end of the unit. Eric says, "They will be needed wherever meters are read, products are weighed and tools are positioned". First year sales are expected to be in the neighborhood of \$1 million with sales of \$16 million forecast for the not-too-distant future. . . . **Henry S. Rowen**, who has been assistant director of the Bureau of the Budget, is the new president of the Rand Corporation as of January 1, 1967. Henry was in the corporation's economics department from 1950 to 1961 when he entered the federal service as Deputy Assistant Secretary of Defense for International Security Affairs. . . . **Dr. Richard Singleton** is the subject of a biographical sketch in the *IEEE Transactions* and we are glad to find out what he has been up to. After obtaining B.S. and M.S. degrees from M.I.T., he earned the M.B.A. degree and the Ph.D. degree in mathematical statistics from Stanford University in 1952 and 1960 respectively. Since 1952 he has worked at the Stanford Research Institute, Menlo Park, Calif. Initially he was an operations research analyst working on inventory control problems, airline passenger reservation system design, and management control studies. More recently he has been working on problems of statistical inference, threshold switching functions, time series analysis, and coding theory. Dick is a member of the Operations Research Society of America, the Institute of Mathematical Statistics, the Research Society of America, Sigma Xi, and Eta Kappa Nu.—**Fletcher Eaton**, Secretary, 42 Perry Drive, Needham, Mass. 02192

## '50

Here it is 1967! In behalf of all our classmates, I wish each of you a happy New Year! Let's finish off 1966 before we move into 1967! First, and most important of all, let's congratulate **Clause Manasse** for making the "big drive" by marrying lovely Ellen Stuart this year. I hear they had quite a honeymoon—traveling the Scandinavian countries of Denmark, Sweden, Norway, etc. Clause also is moving up the International Telephone & Telegraph pole of command—now serving as manager of systems and procedures at the corporate level. The happy couple is living in Manhattan at East 79th Street, and everyone is welcomed to visit (on my invitation!). . . . Did you know that one of our classmates is the head of an independent girls day school in Manhattan? Sounds like a real fun thing to do; but, wouldn't you know, it's one of our coeds. **Dr. Cecily Selby** is headmistress of the Lenox School where we find she is combining the sciences with the humanities to



make the students M.I.T.-genius-type human beings. . . . I hear that **Charlie Grice** is living in Houston, Texas, where he is employed by the Schlumberger Company as manager of ocean engineering for one of its divisions. He is active in developing and applying well logging techniques in the broad field of oceanography. . . . **Saleem Rizk** is living at 2 Thomas Rd. in Lynnfield Center, Mass., where he is working for Raytheon as chief engineer of the Mechanical Components Department. He is heavily involved in both military and industrial electromechanical devices. He's the proud father of a boy and a girl. . . . **Dick Hebert** received his Ph.D. from Brandeis University in 1964 and is living at 28 Ruthellen Rd. in Chelmsford, Mass. Dick is working as Research Chemist for Cabot Corporation in Billerica. He also is the proud father of two children. . . . We hear that **Ed Pershe** is living in Newton, Mass., and is teaching at Northeastern University in the Department of Civil Engineering. Ed received his Ph.D. in Sanitary Engineering from the University of Illinois in June 1966. . . . I was pleased to receive some details about **Gustavo Gross** who is living in Ecuador where he has his own electrical installation company. Prior to returning to his field of electrical engineering he had an interesting political career. He was appointed Governor of Guayas Province and later Secretary of the Interior of Ecuador. He later resigned to become general manager of the newly created Instituto Ecuatoriano de Electrificación. . . . I understand that **Vinson Simpson** is to be found in Scotland where he is serving as the managing director of Trane Ltd. Vinson is in charge of all Trane operations in the United Kingdom including a factory in Scotland and a network of sales engineering offices serving Great Britain, Norway, Sweden and Ireland. He joined Trane in '50 and moved from sales engineer to manager of sales service to manager of dealer development. . . . I was pleased to hear that **Roy Roth** received his Ph.D. in organic chemistry from Tech. in 1955. He is presently manager, product research, Central Research Division, at Cyanamid's Stanford Laboratory. He joined the lab after completing his doctorate as an organic chemist and became group leader in 1960. Then in 1964 he assumed his present position where his major interests have been in polymer chemistry and photosensitive materials. He holds several patents in these fields. . . . **Bill Bednar** is with General Tire & Rubber Company in Ohio where he is serving as training instructor. He is responsible for developing and coordinating all corporate training programs. Bill received his M.S. degree from Tech. . . . I hear that **Saul Wolf** is living in Providence, R.I., serving with the Naval Underwater Research and Engineering Station as a physical science administrator. **Dave Loeks** is serving as president of the Mid-Hudson Pattern for Progress, a new regional planning and development organization serving seven counties between Albany and New York City. Previously he was director of the Metropolitan Planning Commission in Minneapolis, Minn. . . . **Milt Hulme** is vice-president of Mine Safety Appliances Company in Pittsburgh,

Pa. He is responsible for product planning and market development activities. Milt attended Harvard Graduate School of Business Management in 1957. He previously served as assistant to the president before being appointed as vice-president. Best wishes to all.—**Gabriel N. Stillian**, 4 Biscayne Drive, Huntington, N.Y.

## '51

**Jon Leffler** is president of J. H. Greiner & Company and lives in Cornwall, Pa., with his wife Ruth and their three children: Jere 14, Linda 12, and Fredric 11. His company is involved in building construction in the central Pennsylvania area and Jon invites all classmates to drop in and say hello. He is learning to fly a plane for relaxation. . . . **Dr. M. C. Flemings**, in collaboration with H. P. Utech, '58, had a paper on the "Elimination of Solute Banding in Indium Antinomite Crystal by Growth in a Magnetic Field" published in the April issue of the *Journal of Applied Physics*. The work was sponsored by the Office of Naval Research. . . . **Dr. Theodore W. Stein** has been elected assistant vice-president-director of development of Halcon International, Inc. He received his S.B., S.M. and Sc.D. degrees in Chemical Engineering at M.I.T. and at present is living in Hastings-on-Hudson, N.Y., with his wife and their two children. . . . **Stan Englund** has been appointed area superintendent in the styrene section of the Dow Chemical Company's Midland Division Plastics Production Department. He has been with Dow since receiving his Master's degree in 1951. . . . **Alan Roberts** has been named to head the new department, USAF Command Post System Engineering, formed by the MITRE Corporation. He will leave Bedford, Mass., and make his new home in McLean, Va. The Roberts have two children. . . . **Herb Scher** has been appointed vice-president, technical manager and a member of the management committee of the Nevamar Company, a division of the National Plastic Product Company, Inc. He has been with this organization since 1946 when he took a leave of absence to come to M.I.T. to get his S.B. in Chemical Engineering. The Schers have three children and live in Hernwood Hts., Md. . . . **Joy and Chris Bolta** and their children Lynne 11, Nancy 10, Christian 8, and Jonathan 5 live in Alexandria, Va. He is head of the project engineering ordnance division of the Atlantic Research Corporation. . . . **Kathleen and George Collins** live at 10 Shady Lane (tell us, George, have you met that "naughty lady" yet?), Rhinebeck, N.Y., with their two boys George Jr. 12 and Robert 7. George is an advisory engineer for IBM and enjoys skiing in his off time. . . . **John Morganthaler** is a project scientist for General Applied Science Labs, Inc. He is involved with a project on supersonic mixing, and will publish on this subject in *The International Journal of Heat and Mass Transfer*. John was attending night school to finish up his Ph.D. He and Kay live in Greenlawn, N.Y. and have two children John David 6, and Jennifer Ann 4. . . . **Milt Robinson**

is president of M. C. Robinson & Company in Ashtabula, Ohio. In his spare time he teaches in a technical school while wife Elaine looks after Erica 10, Mary Jo 8, and Amy 5. . . . **Steve Eisen** is also president of his own company, Stephen E. Eisen Assoc. Ltd., dealing in insurance. He lives with wife Mickey and twins Susan and Barbara 8, and Nancy 6, in Plainview, N.Y. In addition to bowling, golf and gardening, he is active in state and local politics. . . . **Julie and Gregor Gentleman** have five children (all were at the reunion): Karen 11, Marcia 9, Katherine 8, Brooks 5, and MacGregor 1. Gregor is an owner of Swanson-Gentleman, Inc., and Owls-Head Engineering Company, Inc., and a vice-president of Crestwood Corporation. . . . **Karel den Tex** writes that he is back in Germany with IBM after eight years here. He received a great welcome in Germany from **Stan Marcewicz** who is also with IBM. Karel states that anyone peeling off of the Autobahn at Augsburg will receive a beery welcome in return for some stateside news. . . . **Saverio Greco** has been made associate engineer at Socony Mobil Engineering Department in New York City. He has been with Socony since 1962; prior to that he was with M. W. Kellogg whom he joined after graduating from M.I.T. in 1951. The Grecos live in Valhalla, N.Y., and have three children. . . . **Jim Kuhn** is head of design and development for Kenner Products Company, toy manufacturers. Three boys ages 10, 8, and 3 and a girl 6 fill up the Kuhn household in Cincinnati. . . . **Theodore T. Hader** is a licensed professional engineer in New York and operates as a consultant in the analysis of pneumatic and dynamic systems, structures, and thermodynamics. He lives in Montvale, N.J. . . . **Dr. Walter Wells**, wife Marjorie, and children Cynthia Ann 16, and Gregory Dean 10, are spending 18 months in the Marshall Islands on a project for M.I.T. Lincoln Laboratory. Walt writes that excellent equipment, top notch people, and worthwhile outputs combined with a South Sea Island atmosphere make it an enjoyable assignment for the entire family. . . . **Erhard Thierfelder** is a lawyer with his own firm and makes his home in Morristown, N.J., with his wife Dolores and their two young sons Mark 3 and John a little over a year. . . . **Robert E. Wilson, Jr.**, lives in Falmouth, Mass., where Bob is an architect. Bob and Gertrude have two children Beth 12, and Grant 8. . . . **Elanor and Tom Veale** also have a girl and boy (Beverly is 6, Todd 4). Tom is a member of ACM and MENSA (I know that **Dave Findlay** also made MENSA—how many others of you have?). . . . **Pegge and Pete Piccoli** live in Towson, Md., and they have two children (one of each). Pete has just completed a successful project for the Apollo Range Instrumented Aircraft Program as program manager. He is now business area manager for range instrumentation systems at Bendix Radio Corporation also in Towson. . . . I have another feature article on our own **Dr. Gerald Austen**: this in the *Boston Globe* and headed "Harvard's Brilliant Dr. Austen—the Top of the Ladder at 36." Among his very many

honors and achievements, he is now the second youngest man ever named as full professor of surgery at Harvard Med. (We reported more extensively on Jerry in the March and November issues of the Review last year (1966). . . . And one final note if we are not too late, we have been asked to announce the 19th annual M.I.T. Fiesta in Mexico on March 9-11, 1967. An exciting program is on tap again and reservations can be made through Armando Santacruz B., M.I.T. Club of Mexico City, Reforma 116-804, Mexico 6, D.F., Mexico. . . . This month's news brought to you by—**Walt Davis**, Assistant Secretary, 346 Forest Avenue, Brockton, Mass.; **Howard L. Livingston**, Secretary, 358 Emerson Rd., Lexington, Mass. 02173; Assistant Secretaries: **Mickey Alper**, 1130 Coronet Ave., Pasadena, Calif. 91107; **Paul Smith**, 11 Old Farm Rd., N. Caldwell, N.J.

## '52

With sadness I report the death of **James Lee Stockard**, suddenly, in December, at his home in Lexington, Mass. Jim, after an active undergraduate career, stayed with M.I.T. working for the Instrumentation Lab while studying for his Doctorate and became an assistant professor in the Aeronautical Engineering Department. From M.I.T. he went to A. C. Electronics, Wakefield Research and Development Laboratory, a division of General Motors, where he was a senior staff engineer at the time of his death. Our sympathy to his wife, Joan, and to his son Christopher. Several classmates attended the Memorial Service which was held at the M.I.T. Chapel on December 12, 1966. . . . In *Science*, August 1966, there appeared a book review of *T'ien-Kung K'ai-Wu, Chinese Technology in the Seventeenth Century* by **Nathan Sivin**, who is now with the Department of Humanities at M.I.T. and is a specialist in the history of Chinese scientific history. . . . Important news!!! The Reunion Committee is hard at work and announces that all class members will be receiving a series of mailings announcing detailed plans of our 15th Reunion at the Wychmere Harbor Club, Harwichport, Mass., on the 9th-11th of June, tying in with Alumni Day for those who wish. This exciting weekend on sunny Cape Cod will provide an opportunity to renew old acquaintances, relax, and socialize. Be sure to take advantage of the special bargain deal in the first letter, and return your reservation early. . . . An interesting article in the *Architectural Forum* on the work of **Piotr**

**Kowalski** of Paris who has been working with the field of elastic membranes show some of the amazing forms obtainable with concrete poured into shaped flexible rubber molds. . . . Another architectural article in the *New England Real Estate Journal* by **Barnett B. Berliner** on the advantages of row and cluster housing for urban needs, was accompanied by sketches of some developments currently in process which looked most attractive. . . . **John Magarian** stated the history of Fairchild's Semiconductor Division (Fairchild Camera and Instrument Corporation of Syosett, L.I.) in an article in the Boston Sunday *Globe*, where the South Portland, Maine, plant is described as the leader in the field of integrated circuitry. The technique is an integrated circuit combining in one wafer of silicon all the components normally wired together or inserted into a printed circuit board. John is currently plant manager. . . . **Allan Chin** is now with Raychem Corporation in Redwood City, Calif., after having spent twelve years with General Electric. . . . **George Langer** is on the staff of the National Center for Atmospheric Research in Boulder, Colo. . . . Capt. **Kenneth C. Wallace** has been ordered as the next commanding officer of the nuclear cruiser, *USS Long Beach*, home port in Long Beach, Calif. . . . And **Glyndon L. Lynde** has retired from the USAF and is now with the Travelers Research Center, Inc., in Hartford, Conn. . . . Dr. **Harold Roth** has moved to Needham, Mass., as he has recently joined the NASA Electronics Research Center in Cambridge as branch chief of advanced research, Components Technology Laboratory. . . . Comdr. **James F. Sands** has retired from the Navy and is with the Johns Hopkins Applied Physics Laboratory in Silver Spring, Md. . . . Dr. **Granger G. Sutton, Jr.** is at Staff University Hospital, Baltimore, Md., where his specialty is neurology, and electroencephalography. . . . **Donald Jaffe** received his Ph.D. in Metallurgy from Carnegie Tech in June 1963, and presently is a member of the technical staff of Bell Telephone Labs in Allentown, Pa., where he is working on magnetic materials for memory applications. . . . And **Forbes E. Forbes** after spending time free-lancing all over Europe and the Middle East, returned a year ago to the U.S.A. with his German bride. He is now working as a project engineer at Weston Hydraulics, Ltd., mostly concerned with servo-actuators and flight controls. . . . **Madeleine Sullivan** of the M.I.T. Instrumentation Laboratory programs the three-dimensional dynamics of the Apollo vehicle and its controls systems, and published an interesting article on the hybrid simulation of the Apollo guidance and navigation system in *Simulation* magazine. That is all for now. Please write, and remember, get those Reunion reservations in early.—**Dana M. Ferguson**, Box 233 Acton, Mass.

## '54

Dr. **Henry Hirsch**, VIII, reports that after graduation in '54, he spent three years at

Bell Labs learning "all about" electrical engineering, then back to Tech for three years of grad study in Course VIII. His first post-doctoral job was with the National Institute of Mental Health ("in biophysics, not as a patient"). He is currently at the University of Kentucky in the Department of Physiology and Biophysics and sends "greetings from the Blue Grass State to all you hay-fever sufferers". . . . Dr. **Marshall Nathan**, VIII, joined IBM in 1958 after receiving his doctorate in Physics from Harvard. Since 1961 he has been doing research in semiconductor physics in the areas of hot electrons, tunnel diodes and luminescence at the IBM Thomas J. Watson Research Center in Yorktown Heights, N. Y. Dr. Nathan is a Fellow of the American Physical Society. . . . **Frank Krawczyk**, II, has been appointed to the Greater-Lowell Regional Vocational School Planning Committee. . . . **Richard Finn**, VI-A, has left M.I.T.'s Industrial Liaison Office for Edgerton, Germerhausen and Grier's product division, where he is sales and marketing manager of the nuclear instrument department. . . . **William Gleckman**, IV-A, has established an independent architecture practice in New York City and is currently engaged in a number of "interesting projects in the residential, commercial, and parking garage fields." . . . Dr. **Laurence Leonard**, III, is investigating the effects of high amplitude ultrasonics upon metals. Dr. Leonard is an assistant professor of metallurgy at the Case Institute of Technology. The study may provide the basis for commercial application of ultrasonics to metals. . . . Dr. **Jerome Catz**, II, noted strain gage specialist and associate professor of mechanical engineering at the University of Miami in Coral Gables, Fla., is directing a seminar on strain gage techniques to be held in January. Dr. Catz will lecture on strain measuring systems and instruments, dynamic strain measurement, and photoelastic coatings. . . . **Anthony Romano**, I, addressed the Men's Club and discussed Springfield's 40-million dollar Business District Project. In the November issue of the Review we reported a price tag of 31 million for the project. Prices are rising! Among recent projects with which he has been involved are the Technology Square project in Cambridge and the State Street Tower project in Boston. . . . **Bill Coderre**, II, is working on Mars and Venus planetary landers for Avco in Lowell. Bill, wife Vicky and two children, Billy and Aline, live in Andover. . . . Dr. **David Chesler**, VI-A, is at Sylvania's Applied Research Laboratory in Waltham, where he has been concerned with a wide range of communication problems including secure communication systems, Rohr systems and adaptive systems. . . . At the AIAA meeting in Boston I met **John Zvara**, XVI, who is a project leader at Kaman Avi Dyne in Burlington, Mass., doing research in lifting reentry vehicles which can land horizontally at night or in any weather as opposed to the massive recovery efforts at sea now used. John reports that **Warren Weatherill**, XVI, is working at aeroelasticity at Boeing and that **John Zarcaro**, XVI, is at NASA in



James L. Stockard, '52



Houston. . . . **Charlie Masison**, XV, ran into **Walt Maciag**, VI, at the same meeting. Walt has left Sylvania and has joined Bell Aerosystems, where he is in charge of long-range planning. He will be using his crystal ball to anticipate products of ten years in the future and will influence allocation of development funds. . . . Charlie and I had an enjoyable reunion with **Sam Losh**, II, at dinner after meeting at the AIAA Show. Sam is a senior systems engineer at Electro Optical Systems, Inc., in Los Angeles, and was East on business. He lives in Pasadena in an area (as reported in this column before, December '65) loaded with wild life—the deer, squirrel, etc. kind—not the type of wild life usually associated by many of us with Los Angeles.

More news from our graduate classmates. **Edward Warekois** at M.I.T.'s Lincoln Laboratory last summer helped organize a conference on the preparation and properties of electronic materials for the control of radiative processes for the Metallurgical Society of the American Institute of Mechanical Engineers. . . . **Dr. Henry Lewis** is director of RCA's Electronic Research Laboratories in Princeton, N. J., where a common TV phosphor has recently been converted into the first solid state laser to produce ultraviolet light. . . . **William D. Toole** spoke on spot zoning and future planning for the Springfield, Mass., area at a Franconia Civic Association meeting. Bill is a member of the Springfield Planning Board. . . . Colonel **William Kratz** has assumed duties as district engineer for the U. S. Army Engineer District at Kansas City. . . . **Dr. Niranjan M. Parikh** is director of metals research at the I.T.T. Research Institute (formerly Armour Research Foundation) of Chicago, Ill. . . . **George Phillips** recently joined Tootsie Rolls Industries, Inc., as vice-president, corporate operations and development. . . . **Dr. James C. Wei** has received the 1966 Award in Petroleum Chemistry of the American Chemical Society. . . . **Dr. Otto Lerbinger**, a professor in the Boston University School of Public Relations, spoke at the Niagara Frontier Chapter of the Public Relations Society of America on "The Impact of the Information Explosion and Environmental Explosion on Business." . . . **Earle Lomon**, in pursuing the highly theoretical physics of quantum electrodynamics at M.I.T., has suggested an explanation which promises to resolve an experimental discrepancy discovered by a group at Harvard. . . . **Dr. Francis Gabriel Wolfort** was appointed Research Fellow in Surgery. Dr. Wolfort is associated with the Massachusetts General Hospital. . . . **Hamilton Bowser** has been appointed vice-president and design manager of Engineers, Inc., a Newark, N. J., consulting engineering firm. . . . **Dr. Thomas Vasilos** recently helped prepare a paper entitled "Origin of Grain Boundary Diffusion in Mg O" for the *Journal of the American Ceramic Society*. Dr. Vasilos is assistant department manager of metals and ceramic research and development for Avco. . . . **Dr. Frederick Sanders** of M.I.T. was chairman of the severe storms session at the 12th Conference on Radar Meteorology of the

American Meteorological Society, held in Norman, Okla. He had also chaired a session in general meteorology with emphasis on clouds at the 46th Annual Meeting of the Society in Denver last spring. . . . **Leon J. Ricardi** of M.I.T.'s Lincoln Laboratory published a paper in the *IEEE Transactions on Microwave Theory and Techniques* entitled "A Diplexer Using Hybrid Junctions." . . . **Maurice Smith** is active in a Connecticut community theatre group, directing such productions as *Ladies on Retirement* and *Under the Yum-Yum Tree*.—**E. David Howes**, Acting Secretary, Box 66, Carlisle, Mass.

## '55

At this moment (December) we're hoping for a big Christmas mailbag since we're running low on news. We'd especially like to hear from those of you who have made a major move lately; we often get the new addresses, but not the interesting details behind the move. . . . **Jim Abrahamson** is presently one of fourteen students attending the USAF Aerospace Pilot School at Edwards, Calif., for a special six-months course. Selections for future astronaut crew training with NASA are made from graduates of this school. Since 1955 Jim has earned a master's degree at the University of Oklahoma, served in Vietnam, and married Barbara Stuckey of Morgan Hill, Calif., among other accomplishments. . . . **Russell Lamp** graduated from the U. S. Army War College in Carlisle Barracks, Pa., in June. . . . Civilians again are **David Moreira**, who is now in Sorel, Quebec, and **Bob May**, now in San Diego. . . . Several classmates have added the title of "Doctor" to their names. **Al Wechsler**, who is with A. D. Little in Cambridge, has received a doctorate from M.I.T. **Sid Diamond**, who is in Monroeville, Pa., has acquired a doctorate, also **Nick Kafes** who received his in October from Lehigh. . . . **Warren Bennis**, social psychologist, Professor of Industrial Management at M.I.T., spent last year as visiting professor at the Indian Institute of Management in Calcutta. His most recent book, *Changing Organizations*, was published in 1966. . . . **Bob Kohler** is now in Buffalo, N. Y., in the physics department of the State University College at Buffalo. . . . **John Seagle** is also in Buffalo, having moved from Palo Alto. . . . **Dave Rados** is back East at the Columbia University School of Business. . . . **Paul Goldan** has gone in the opposite direction, from Dartmouth to Boulder, Colo. . . . **Elliot Cramer** is now in Chapel Hill, N. C., having left the Miami area. Some other moves of note: **Ash Stocker** to Mountainside, N. J.; **Don Evans** to Baltimore; **Joe Vacca** to Weybridge, Surrey, England; **Bill Leahey** to Honolulu. Sorry we lack details. . . . **Phillips Brooks** is now manager of the Digital Instrumentation Retail Group of the American Optical Company, formerly the Syber Laboratory. The group will remain in Waltham at the Syber facilities until a new AO research lab in Framingham has been completed. It will continue

the work for which Syber was best known, examination of visual pathways to the brain with an electronic system, and will extend its program to investigation of new medical fields in which digital instrumentation can be effectively used.—Co-secretaries: **Dell Lanier Venarde** (Mrs. J. H.), 16 South Trail, Wilmington, Del. 19803; **L. Dennis Shapiro**, Aerospace Research, Inc., 130 Lincoln Street, Boston, Mass. 02135

## '56

With the reunion, our questionnaire, and Tech updating the Alumni Register, 1966 must be classified as a banner year for information for the articles. I hope we can maintain the pace. . . . **Mac Edwards** wrote us last September from London where he is on a two-year National Institute of Health fellowship at the Middlesex Hospital Medical School Department of Physiology. Mac graduated from the University of Pennsylvania Medical School in 1962, interned at Johns Hopkins and then spent two years back at the University of Pennsylvania doing research on respiration and teaching dental students. Mac wed Doana Hayes of Broomall, Pa., in 1963 and they are renting a cottage from **Jack Broyles** until they return to the U.S. in September. In November along came a letter from Jack Broyles explaining that he is working on his Ph.D. at the London School of Economics but expects to return to the U.S. in 1968. Before moving to the U.K., Jack obtained his masters in mechanical engineering from Rensselaer and was production planning manager for Ludlow Corporation. Now, however, he is busy constructing a stochastic model of New York Stock Exchange trading. Jack wed Anthea Bean in England in 1960, and they have two children, Derek and Clive. Both Jack and Mac are interested in seeing classmates passing through London. . . . Peter and **Chris Booras** of Keene, N. H., are back on the inventive trail again. After achieving some success with wooden Christmas cards a few years ago, they have now formed the Verily Development Company to exploit a system for baking a continuous loaf of bread. This eliminates the end crusts in a sliced loaf which many people treat as waste. . . . **Chester Bell** was appointed associate professor of computer science and electrical engineering at Carnegie Tech last fall. Previously he served as chief engineer and manager of large computer engineering at Digital Equipment Corporation. . . . **Arnold Breeden** is continuing to work in engineering at Martin in Baltimore. Arnold visited Hawaii in 1965 and Mexico in 1966. . . . **Walt Frey** continues to work on aircraft evaluation and contract administration of airline aircraft for Pan American World Airways. Recently this included a trip to Bristol, England, and Versailles, France, to review the status of the Concorde SST. Walt is also active in the M.I.T. Club of New York and in promoting class affairs in the New York area. Contact him at 193 Kil-dore Rd. in Garden City. . . . **Jacob**

**Gubbay** has been with the EDP Division of Honeywell in Waltham, Mass., since last June as a materials consultant. Before that he worked for Singer in New Jersey and received his masters in metallurgy from Stevens Tech. Jacob also has two patent applications to his credit. Last year he vacationed in London and Paris. . . . **Stuart Harvey** is an instructor manager at the IBM regional education center in Chicago and has also established a Montessori School in Lake Forest. Stuart was married in 1960, and the Harveys now have four children, three girls and a boy. They have a trip to the Bahamas scheduled for April. . . . The Lahey Clinic of Boston has announced the appointment of Dr. **David Kelley** to the Department of Internal Medicine. Dave served his residencies at Hartford Hospital and the Lahey Clinic after attending the Boston University Medical School. . . . **Phil Lieberman** writes that he completed his Ph.D. in Linguistics at Tech a year ago, and his thesis will appear in an M.I.T. Press monograph this month under the title of "Intonation, Perception and Language." Phil's wife Marcia also completed her Ph.D. last year in English at Brandeis. During the summer they vacationed in Southern France and then traveled to Moscow and Leningrad where Phil presented a paper at the 18th International Congress of Psychology. Even with all this activity the Liebermans have managed to start a family of two boys. . . . **Louis Martel** writes that he is manager of Nuclear Materials Irradiation Group at General Electric. In 1964 he was president of the M.I.T. Club of Schenectady. The Martels have four children.—**Bruce B. Bredehoft**, 16 Millbrook Road, Westwood, Mass. 02090; **T. Guy Spencer, Jr.**, M.I.T. Room E19-439, Cambridge, Mass. 02139, Co-Secretaries

## '57

January was the month of the "Class of 1957 Ten-Year Profile Questionnaire." It is designed to answer questions about where we are and where we have been, and it served that purpose quite well as you will find out at the reunion. If by chance you did not get a copy of the questionnaire, drop a line to Malcolm Jones, Room 53-383, M.I.T., Sloan School of Industrial Management, 50 Memorial Drive, Cambridge, Mass. 02139. Also send along any questions or suggestions regarding the reunion. Mal will see that the appropriate member of your committee answers your letter. This is the age of computers and specialization, and your committee is no exception to the rule. We have tackled our task with devotion and programmed the Jug End week-end for gaiety and relaxation. Dig out that reservation form and mail it today, if you have not done it by now, and start planning your trip to Jug End. We all want to see you.—**John A. Currie**, Aberthaw Construction Company, 60 State Street, Boston, Mass. . . . The notes this month are very short. First there are a few news releases. **Bill Walsh** is now a planning associate in the plan-

ning department of Mobil Oil Company. Bill joined Mobil in 1958. Since then he has held several planning and economic positions, primarily in marine transportation. Following his receipt of a B.S. degree in naval architectural and marine engineering he stayed at Tech for an M.S. degree in shipping and shipbuilding management. He is married to the former Helen E. Rowe of Westfield, N.J. They have two sons. . . . **Julian Cherubini** served as chairman of the nuclear radiation session for 12th Annual Institute of Environmental Sciences Technical Meeting and Equipment Exposition. Julian has been employed with the High Voltage Engineering Corporation, Burlington, Mass., for the past five years and has been in charge of facility planning in relation to government laboratories and universities. Prior to this he was with the Oak Ridge National Laboratory engaged in nuclear fuel element development and evaluation. Julian earned a Master's degree from the University of Tennessee. He holds a number of patents in the field of nuclear radiation and has delivered several papers dealing with fuel element manufacturing techniques, evaluation, and gas metal reactions. . . . **John S. Brown, Jr.**, has been appointed assistant professor of physics at the University of Vermont. He was formerly a National Science Foundation Fellow at Rutgers where he received his Ph.D. . . . **John Roberts**, who received his law degree from the University of Virginia following M.I.T., was awarded the Robert C. Watson Award of the American Patent Law Association for the best paper published during the period November 1964 to November 1965 dealing with the economics of patents. The \$500 prize was presented at the Association's annual dinner in honor of the federal judiciary on January 26. Prior to entering the Army where he served as 2nd lieutenant, John was an engineer with the Procter & Gamble Company. He is now associated with the firm of McLean, Morton & Boustead in Washington, D.C. . . . A letter from **Harry Mallett** brings us the following information: "After graduation I was employed by the Boeing Company as a structural dynamicist in Seattle, Wash. In November of 1961 I was married to Marlys K. Stennes of Mountlake Terrace, Wash. The following summer we moved to the South (Huntsville, Ala., and then New Orleans, La.) as Boeing became involved with the Saturn V. Last fall I took an educational leave of absence in order to attend Stanford University where I have just received my M.S. in Engineering mechanics. While at Stanford my wife gave birth to our first child, Jeffrey. After another summer in New Orleans we will head for M.I.T. where I will start work on a Ph.D. in Mathematics." . . . I received almost a year ago an announcement of the wedding of **David Wolsk** to Miss Nancy Coleman in Gloucester, Mass. I am sorry for the delay in reporting this item. . . . Tonight **Paul Nicholson** and his wife will be stopping by our flat for drinks; I hope to have an item on his activities here in London in next month's news. That's all for now—**Frederick L. Morefield**, Secretary, 18 Whaddon House, William Mews, London S.W. 1, England

## '58

This month the column is a report on the activities of some of the '58 contingent working with Texas Instruments at various locations. Since returning this fall to the T.I. plant in Attleboro, Mass., it seems like I've been running into classmates at every turn. Walked into the plant cafeteria on the first day back and sat down next to **Dick Barone**. He had just started with T.I. that week in our materials division. Dick is a member of the technical staff and will be in charge of a project team handling specific assignments. After graduation Dick stayed on to get his S.M. and then went to work with the Walworth Company R&D laboratory in So. Braintree, Mass. Three years later he yielded to the call again and went back to Tech for his Ph.D. while holding down an assistantship. Dick is a member of a select group whose ranks diminish steadily—the '58 bachelors' society. He is still living in Belmont and commuting—our bachelor benefits, he says, are not up to those in Boston. . . . Another addition to the materials division is **Jim Mahaffy** who will be a senior quality engineer for strip metal products. Jim came to us from Curtis Wright where he supervised the non-destructive test development section and the Radiographic Inspection Department. Prior to this he was a senior metallurgical engineer with Hamilton Standard Division of United Aircraft. Jim and his wife Joyce are the pleased parents of a nine-month old son 'D.J.' . . . Incidentally, for those of you who may not be familiar with this division of T.I.—this is the group that produces the metal sandwich material for the new 'silver-less' coins. T.I. is the major supplier of this material to the Mint. Another product of this group which is in the news lately is copper clad aluminum wire which has obvious advantages in view of the copper shortage. The other major group in Attleboro is the control products group which is part of the apparatus division of T.I. In this area we produce control devices and systems for the military, industrial, appliance and motor markets. (This is the group in which yours truly is working.) . . . **Pete Lynch** gets involved with both divisions in Attleboro as he is an employment manager in our Personnel Department, a surprise for those of you who remember his Course III background. Pete joined T.I. after graduation in the Nuclear Department and moved through a wide range of positions from R&D to manufacturing supervision. To further broaden his background, Pete accepted an opportunity in the personnel area and has been working in it for the past three years. During this time he and his wife Marguerite have been busy raising their five children—three boys and two girls. (We really needed Pete in personnel because he was an expert on tax deductions and withholding taxes.) They have bought an older home in the area and have been busy remodeling. Short message from Pete: "if you're looking. . . ." (Short message from class Secretary: "if Washington is reading—we're an equal oppor-



tunity employer!"). . . . Down in Dallas I've talked with **Harry Weintrob** who has joined the Corporate Management Systems Department. They are using operations research and management science techniques to develop better management systems. On the staff of six with Harry are two other M.I.T. Course XV men and a Sloan Fellow. Joan and Harry now have two boys—David and Elliot. Joan is working part-time. Prior to coming to T.I. Harry was working in military operations research at the Technical Operations Corporation in Washington, D.C. One of the current projects on which he is engaged is in the integrated circuit manufacturing area. In this assignment he often works with **Harry Ross** in the product planning section of the integrated circuits department. Talked with Harry and found that he has moved about the Dallas operations in various product groups. He is now supervising the planning activities for integrated circuits. As he is still leading the gay single life, he manages to play a lot of golf during the year. Also managed to take part in some Alumni Fund activities in the area during the past year.—**Michael E. Brose**, Secretary, 1171 North Street, Walpole, Mass.; **Antonia D. Schuman**, Western Associate, 22400 Napa Street, Canoga Park, Calif.

## '60

**Bob Slusser** writes: "After receiving an M.B.A. in Industrial Management ('62) from the Wharton School, University of Pennsylvania, I spent two years at NASA Headquarters in Washington as a program analyst, and have been at Northrop Space Laboratories since. I am currently assistant to the Director of Applications Engineering. I'm still a footloose bachelor, and Los Angeles is a great place for bachelors. My new address is Apartment 313, 3640 Sepulveda Blvd., West Los Angeles." Thanks for the news, Bob. . . . And more mail—this time from **Bob Stengel**: "I'm in my fourth (and hopefully last) year at Princeton, working on my Ph.D. in Aerospace and Mechanical Sciences. My research, sponsored by a NASA grant, concerns a rapid means of measuring wind profiles to high altitudes. My wife, Pegi, received her B.S. in Business Administration with honors from Rider College this past June and is working as a research assistant at Mathematica, a Princeton-based economic consulting firm. Incidentally, at the 10th Reunion of the Millburn (N. J.) High School Class of '56, of which both **Ralph Buncher** and I are members, can you guess who got the prize for having lost the most hair? (Hint: Not I.)" Ralph seems to be picking up prizes wherever he goes—he won the same prize at the '60 Reunion in 1965. . . . Gerry and **Barbara Stephenson** visited us last weekend; they've just returned to the East Coast after two years in California. Barbara is working at NSA—where she reports having run into **Addison Ball**—and Gerry is an assistant professor of physics at the University of Maryland. And while the Stephensons were here, the **Farquhars**—Tom and Barbi—dropped by

looking annoyingly tanned and healthy after a two-week vacation in Hawaii, following several days in San Francisco to attend the Fall Joint Computer Conference. . . . Since the Technology Review is now printing the Class Notes section on better paper, you've no doubt noticed that photographs are being included occasionally. I can accept good quality, glossy photos, but would prefer to stay away from fuzzy shots of the backs of your children's heads—if you know what I mean. . . . We got a Christmas card from **Rudy Marloth** with the notation, "When He said 'Be fruitful and multiply,' we took Him at His word." Which I think serves to announce the birth of his latest child—whose name I forget but will report next month. (I'm writing this at the office with only fragments of letters, notes, etc., and very few of the things I really need, like Rudy's Christmas card.) . . . Drop a postcard in the mail telling us all; send it to—**Linda G. Sprague**, 345 Brookline Street, Cambridge, Mass. 02139

## '62

**Dr. Steven Orszag** is at the Institute for Advanced Study in Princeton, N. J. . . . **Bruce Smith** is in the Department of Physics and Astronomy at the University of Maryland in College Park. . . . **Philip Ruziska** is working at Esso Research and Engineering Company in Florham Park, N. J. . . . **David Nickles** is at the duPont Development Labs in Newport, Del. . . . **Ed Feustel** is at the Willis H. Booth Computing Center at California Institute of Technology in Pasadena, Calif. . . . **Stephen Handel** is in the Department of Psychology at Kansas State University in Manhattan, Kansas. . . . **Dr. Eugene Finkin** is working for Douglas Aircraft Company in Santa Monica, Calif. . . . Miss **Judith Selvidge** left J.P.L. in 1964 to study for a graduate degree in statistics at Imperial College in London. She is now at the Harvard Computing Center. . . . **Francis W. Kaseta** co-authored a paper that was printed in the June issue of the *Journal of Applied Physics* entitled "Temperature Dependence of Dielectric Breakdown of Potassium Chloride Crystals under dc and Pulse Voltages." . . . **William A. Jeffers, Jr.**, was named an assistant professor of physics at Lafayette College in Easton, Pa. Prior to joining the faculty of Lafayette Dr. Jeffers was a senior physicist at Battelle Memorial Institute in Columbus, Ohio. . . . **M. A. Wahlig** co-authored a paper entitled "Etemeson Branching Ratio into Pi plus Gamma plus Gamma" which was printed in the July *Physical Review Letters*. . . . First Lt. **Neil Weatherbie** has received a regular commission in the U.S. Air Force at Clark A.F.B. in the Philippines. He is serving as a communications officer. . . . **Dr. Richard H. Rein** was appointed assistant director of research by the Linde division of Union Carbide Corporation. He will have responsibility for all project research at the Tonawanda Research Lab except for bioresearch. Dr. Rein's experience prior to joining Linde included work in the metallurgy lab and open hearth fur-

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Richard H. Rein, '62

nace area at Republic Steel Corporation, and as a research engineer engaged in alloy development at Youngstown Sheet and Tube Company in Youngstown, Ohio. He has also been an instructor at M.I.T. . . . **Sheldon Hoffman** is at Columbia University in N. Y. . . . **Dr. Robbin R. Hough**, who earned his doctorate at M.I.T. in 1962, was named chairman of the Department of Economics-Business at Michigan State University. . . . **Dr. Arnold L. Prill** has joined Sintercast Division, Chromalloy American Corporation, West Nyack, N. Y., as chief metallurgist. He was formerly research metallurgist for International Nickel Company. . . . Miss **Julia Broderick**, chief planner of the Metropolitan Planning Council in Braintree, Mass., recently delivered an address entitled "Metropolitan Space Planning" at a Braintree Rotary meeting. . . . **William Geoghegan** is in the Department of Anthropology, Stanford University. . . . **Michael Hall** is in the Math Department at U.C.L.A. . . . **Dr. David Knee** is in the Math Department at Hofstra University in Hempstead, N. Y. . . . **Robert Matia** is working at Squire, Sanders, and Dempsey in Cleveland, Ohio. . . . **Dr. Lynn Whelchel** is interning at the Royal Victoria Hospital in Montreal, Quebec. . . . **Richard Orr** co-authored an article entitled "Input Current Compensation for Transistor Operational Amplifiers," which was printed in the July issue of *Simulation*. Mr. Orr joined the analysis group of Sanders Associates in Bedford, Mass., in 1964. Since that time he has been concerned with the development of adaptive phased array radar systems and the organization of user-oriented computer systems. . . . **Dr. John Savage** wrote an article entitled "Distribution of the Sequential Decoding Computation Time," which

First Lieutenant Neil K. Weatherbie, '62, is administered the oath of office for a regular commission in the U.S. Air Force by Colonel Gilbert H. Bertie, commander of the 1st Mobile Communications Group, Clark A.F.B., Philippines.

PHOTO: U.S. AIR FORCE



was printed in the *IEEE Transactions*. He was an NSF Cooperative Graduate Fellow in 1961 and 1962 and a research assistant until he completed the Ph.D. program at M.I.T. During that time he taught two courses in the Department of Electrical Engineering; one was signals and systems and the other was a graduate level course modulation theory and systems. He is presently employed by the Bell Telephone Labs, Holmdel, N. J., where he is concerned with problems in coding and communication theory. . . . **T. J. Greytak** co-authored an article entitled "Spectrum of Light Scattered from Thermal Fluctuations in Gases," which was printed in the July issue of *Physical Review Letters*. . . . I was in New York just before Thanksgiving and saw **Jan Hyde** and his new bride, Phyllis. Jan is working for Hurd & Company in N.Y.C., and they are living in Brooklyn Heights. Also saw **Art Samberg**, his wife Becky, and their new baby, Jeffrey. Art will be graduating from Columbia Business School in January. In December Linda and I ran into **George Meyer** at the Buena Vista in San Francisco (famous for its Irish coffee and happy crowds). George is interning at Southern Pacific Hospital in S.F. Next July he will be entering the Air Force. That's about it. . . . Think reunion.—**Jerry Katell**, Secretary, Oceanic Properties, Inc., One Bush St., San Francisco, Calif. 94104

## '64

Once again I have the sad duty to report that another member of our class has passed away. **Andrew Roskos** was killed in an auto accident in Colorado on September 3rd. Drew was a well-liked and active member of our class whose passing is a great tragedy both to all those who knew him and to the world that has lost his potential contribution. This is the third death reported in our column since it began two years ago. The first was **Abba Weinstein**, also killed in an auto accident, and then **King Clifford**, who died of a congenital heart defect. . . . As for other news, this issue exhausts my backlog of news clippings sent by the Alumni Office. Please send me news of yourself and other classmates for future issues. . . . **Michael Auerbach** was spotted attending the 1966 Alumni Day at M.I.T. last June. . . . **Robert Blumberg** was one of eight finalists last year for the Scott Foundation Award at Harvard Business School, awarded annually to students of outstanding intelligence and leadership. Bob received his M.B.A. in June. . . . **Dean Casperson** became a member of the Peace Corps this past summer and is now in Somalia, in East Africa, teaching math and science. . . . **Cecil Davis** received his M.B.A. from Western Reserve last June. . . . **Max Deibert** had an article published in the July issue of some technical journal (the Alumni Office only sent an inside page!) concerning nickel catalysts interacting with germanium. . . . **Bill Euerle** is working in the Research Department for Bethlehem Steel Corporation. His picture was included in a career



PHOTO: H. VERBY  
Dean Casperson,  
'64

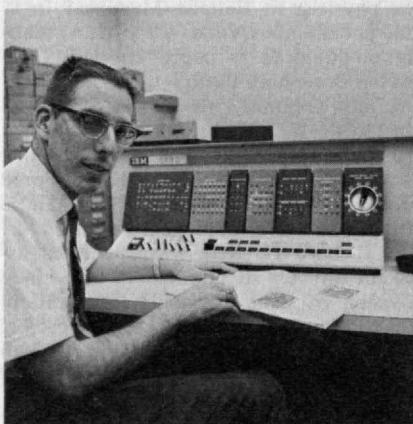
book put out by the corporation. . . . **Jeffrey Friedberg** received his M.S. in geology at Cal Tech last June. . . . **Ronald Lawson** received his M.S. in E.E. from Northeastern in June. He is now working for the MITRE Corporation's technical staff. . . . **Thomas Pyle** was another of the eight finalists for the Scott Foundation Award at the Harvard Business School, along with Bob Blumberg. Tom also received his M.B.A. last June. . . . **Kenneth Ralls** has become a research metallurgist at the U. of Cal's Lawrence Radiation Lab. Before that he was a research associate at M.I.T. . . . **Darrel Ramhorst**, who received his M.S. in aero at M.I.T., is now a 1st lieutenant in the Air Force. . . . **Karen Tomlinson** has accepted a position with General Electric at its Major Appliance Labs in Louisville, Ky. She received her M.S. in E.E. at M.I.T. last June. . . . **Gordon Wassermann** received an M.A. in math from Princeton last June. . . . **Warren Wiscombe** received his M.S. in physics at Cal Tech last June. . . . Let me hear from you.—**Ron Gilman**, 202 A Holden Green, Cambridge, Mass. 02138

## '65

I have really been encouraged by the increasing number of newsletters that have started coming in from all across the country. As this is the time a large number of you are finishing up on the Masters degree, please be sure to let me know what your next plans are going to be. **Roy Wytenbach, Jr.**, and the former Miss Kathy Noyes were married in June and are now living in Cambridge. Roy is working in the industrial loans department of the

Bill Euerle, '64, in *Careers with Bethlehem Steel and the Loop Course*.

PHOTO: BETHLEHEM STEEL CORPORATION



Prudential Life Insurance Company. . . . **Chuck Hurd** is still supervising the overhaul of submarines in the San Diego Naval Yard finishing up his NROTC tour of duty. . . . **Frank Yin** and the former Elaine Yong were married this past September. . . . **Dave Crawford** is currently serving his Naval Reserve commitment aboard a helicopter aircraft carrier which is now heading to the Caribbean after recovering the Gemini 11 capsule. . . . **Wayne Wilner** seems to be fully partaking of the good life around Stanford. He is going through the second-year grad course in computer science with a research assistantship at the linear accelerator and a new GT Mustang. . . . **Jim Postula** recently joined the Electrochemistry Department of the General Motors Research Laboratories in Warren, Mich. . . . **Dick Gray** is a second-year student at the Columbia Law School. . . . **Mike Oppenheimer** is working for Westinghouse in Baltimore and over the summer went to the West Coast to deliver a paper at WESCON. . . . **Charles Gholz** and the former Miss Barbara Dancis of Bryn Mawr were married in September 1965. Barbara is teaching in New York and Charles is a second-year student at Columbia Law School. . . . **Jim Steele** is married to the former Miss Linda Goodman and is now an ensign at the Portsmouth Naval Base. . . . **Norm Eckstein** and his wife Linda are in Chicago where Norm is an internal consultant for Montgomery Wards. . . . **Harry Binswanger** is in the Columbia Graduate School of Philosophy. . . . **Paul Eich** is married and back at M.I.T. . . . **Hank Lichstein** came back to M.I.T. on a visit to interview for Texas Instruments. Hank is working in Management Systems on their Corporate staff. . . . **Frank Deremer** is the Sigma Nu house tutor this year. . . . **Bruce Bottomley** is a 1st lieutenant in the Army assigned as an engineer at the U.S. Army Security Agency Headquarters in Frankfurt, Germany. . . . **Barry Yudell** is in the Grad School of Mathematics at Indiana University. Barry holds a NASA traineeship and is also a part-time teaching assistant. . . . **Frank Gerstle** is working for the Sandia Corporation in Albuquerque designing environmental test facilities for missile delivery systems. . . . **Carol Van Aken** recently co-edited a book, *Women and the Scientific Professions*, which is published by the M.I.T. Press and is a collection of readings derived from the M.I.T. Symposium on American Women in Science and Education. . . . **Magne Wathne** married the former Miss Stefanie Stevens of Buffalo, N.Y., in May and he is now working for the Illinois State Water Survey in Champaign, Ill. . . . **Pete Rogers** married this past summer and is now doing graduate work in physics at Brown. . . . **John Chapman** finished his M.B.A. at the University of Arizona and is now a 2nd Lt. in the Army. . . . **Arthur Sindoris** is doing graduate work in E.E. at N.Y.U. . . . **David N. Smith** is now in the pre-med program at Columbia having completed graduate work in E.E. at N.Y.U. . . . **Dick Bator** is a senior programmer with Wolf R/D Corporation and is currently assigned to the Electric Boat Division of General Dynamics. . . . **Jim Bochnowski** is currently aide-de-camp to the Deputy



Commanding General at the U.S. Army Missile Command at Redstone Arsenal. Jim plans to enter the Harvard Business School in September 1967. . . . **John Beckmann** and his wife Adrienne are now living in Baltimore. Adrienne is working for the Social Security Administration and John is in the Engineering Department of the Aerospace Division of the Westinghouse Defense and Space Center working as a Project Administrator in the Model Development Lab. . . . Finally it is with regret that I must inform you of the death of one of our classmates, **Leonard D. Pressman**. He was killed in a traffic accident while returning home for Thanksgiving vacation from the University of Maryland where he was a graduate student.—**Jim Wolf**, Secretary, McCulloch C-41, Harvard Business School, Soldiers Field Road, Boston, Mass. 02163

## Graduate Students

# XIII-A

**Henry A. Arnold**, '41, visited the Department of Naval Architecture and Marine Engineering in December and led a seminar on "The Need for Ocean Engineering." Hank retired from the Navy in 1961 and for the past five years has been employed by the United Aircraft Corporation as assistant to the chief scientist. In 1963-1964, while on leave of absence from U.A.C., he was technical director of the Navy's Deep Submergence Systems Review Group. He recently joined the permanent staff of the office of the Executive Secretary of the Council for Marine Resources and Engineering Development. With this new assignment, Hank continues a career at the forefront of ocean technology. . . . **Richard Aroner**, '51, is active on the Boston scene. Dick retired from the Navy in 1963 and worked for the Bethlehem Steel Corporation for about two years. Since the Spring of 1965 he has been vice-president of J. E. Bowker Associates, one of New England's budding naval architecture consulting firms. Dick is currently secretary-treasurer of the New England Section, Society of Naval Architects and Marine Engineers. Dick and Pat live in Cohasset with their five lively children, a sailboat, and assorted pets. . . . **Warren Smalzel**, '45, is currently on the M.I.T. staff as Institute Secretary for Corporations. Warren retired from the Navy in 1961. From 1961-1963 he was executive vice-president of Cabot, Cabot, and Forbes Associates. Just prior to joining the Institute Staff in November 1964, Warren was general manager of Mill Accessories, Inc. Warren is responsible for planning and soliciting gifts and grants from corporations and corporate foundations. He, too, lives in Cohasset with his wife and their two sons and three daughters. . . . Another XIII-A graduate living in Cohasset is **J. C. Oldfield**, '44. Barney retired from the Navy in 1965 and joined the Quincy Division, General Dynamics Corporation. He is busy at his first love, seeing ships constructed, as new construction program manager. . . . A Christ-

mas note from **James M. Farrin**, '34, tells us that he and Marge are now in Jacksonville, Fla. Upon retirement from the Navy in 1965, Rear Admiral Farrin became consultant for shipbuilding for Aerojet General Corporation. He expects to be in Jacksonville for about 18 months overseeing completion of five oceanographic ships being built there for the Coast and Geodetic Survey. . . . **William Brinckloe**, '41, was author of an article in the September issue of *Public Administration Review*. As usual, Bill was in the middle of a controversial subject with his topic of "Automation and Self-Hypnosis." Bill is currently associate professor of management science at the Graduate School of Public and International Affairs, University of Pittsburgh.—Captain **Robert E. Stark**, M.I.T. Room 5-304, Cambridge, Mass.

## Senior Executives

The directors of Sears Roebuck & Company announce the appointment of **Gordon M. Metcalf** (Program for Senior Executives, spring 1957) as chairman and chief executive officer, effective February 1, 1967. A vice-president of the company for nine years, Mr. Metcalf has most recently been in charge of Sears' midwestern territory. In addition to his retailing background, Mr. Metcalf has experience in auditing and personnel administration. He and his family live at Two Turvey Lane, Downers Grove, a suburb of Chicago.

**Davis Spencer** has been named president and treasurer of the Eyelet Tool Company, of Cambridge, Mass., manufacturers of eyelet inserting machinery and tools. Prior to joining Eyelet Tool, Mr. Spencer was industrial sales manager for the Carr Fastener Division of United-Carr Incorporated. He is also a director of the Erie Enameling Company of Erie, Pa. A graduate of Princeton University and the Program for Senior Executives, Mr. Spencer resides in Weston, Mass.

## Club News

### M.I.T. Alumni Council: Publications and Committees

Members of the Alumni Council heard progress reports on three Alumni Association publishing projects at its regular meeting on November 28:

John S. Pfeil, '43, business manager of the Alumni Association, has now received over 33,000 questionnaires providing information for the 1966 Alumni Register, which will actually be published in the spring of 1967. As of November 28, at least 3,000 more replies were expected. Prepublication orders are being accepted at \$9.50; the post-publication price will be \$12 per copy.

The 1966-67 Alumni Association Directory will provide information not heretofore included in the annual directories: a geographical listing of all alumni officers including members of the Corporation and its committees, club officers, honorary secretaries and Educational Councillors, and

Alumni Fund regional officers. Publication will be early in 1967.

Copies of the Alumni Center of New York's directory of New York area alumni were available for the meeting; the book is available only to members of the Center, to whom it is sent without charge; Center membership is \$15 per year.

The secretary reported the appointments of Kemon P. Taschioglou, '49, and Harry E. Essley, '36, as chairman and deputy chairman, respectively, of the committee for a 1967 Alumni Officers' Conference; and the appointment of Peter Gwynne as acting managing editor of *Technology Review* (see *An Institute Gazette* in *Technology Review* for January 1967).

John J. Wilson, '29, chairman of the Audit and Budget Committee, reported that the committee has approved the budget for 1966-67; has received and approved the annual audit for 1965-66; and has made six important recommendations concerning financial practices of the Association, of which three have been adopted by the Executive Committee and three have been referred to the Long-Range Planning Committee.

The 1967 Alumni Fund, as of November 25, stood at \$485,514 from 5,374 donors, with additional pledges of \$184,461 from 545 alumni, according to the report of Kenneth S. Brock, '48, director of the Alumni Fund.

Ocean engineering, the topic of Professor Alfred A. H. Keil, head of the Department of Naval Architecture and Marine Engineering, will be the subject of a *Technology Review* feature in an early issue.

### M.I.T. Club of Boston: Doc Draper Speaks

On January 12 the M.I.T. Club of Boston was regaled by Professor C. Stark Draper, who recounted the events attending the formation and functioning of the National Inventors Council. Dr. Draper related his often-hilarious experiences with "Boss" Kettering, Harry Hopkins, J. Herbert Holloman, '40, and others in connection with activities of the Council. John Mattill, your Editor, afforded the Club an unexpected bonus by bringing along NASA movies of the Gemini 12 flight. Paul Weamer, '49, President of the Club, announced at the meeting that 1966-67 attendance at meetings was already above the total year's attendance in 1965-66.

At its next meeting on February 9 the Club will hear Coach Jack Barry and members of the M.I.T. basketball team tell about their summer 1966 tour of Europe and the Soviet Union.—Eugene M. Darling, Jr., Secretary-Treasurer

### Indiana Association of M.I.T.: Travels Behind Iron Curtain Shared

Twenty-five alumni, wives and other guests dined at "The Round Table" at 3742 North Sherman Drive on Thursday, November 10. Afterward David Olan Meeker, a partner along with our own Tom Dorste of the firm of architects James & Associates, recounted for us his many weeks of travel behind the iron curtain. Thousands of miles and many pic-

tures which were shared with us permitted us to see samples of the interesting and beautiful old buildings of eastern Europe together with the simple homes, the "jerry-built" apartments and the inadequate roads. The speaker related his adventures in outwitting and getting along with the bureaucracy and the bureaucrats in these regimented countries. His audience felt that he had succeeded in getting a good picture of the iron curtain countries and in sharing this picture with us. The following alumni were in attendance: Adams, '34; Babbit, '17; Dorste, T., '47; Fay, '53; Harvey, '28; Karcher, '25; McCuen, '40; Miles, '59; Morse, '21; Welch, '13; Wyland '42. Hopper, '33, was absent from the city but was represented by Mrs. Hopper. President Fay announced that he was planning a program on synthetic rubies, their production and use, for the latter part of February.

Our city has an organization known as ISEF (Indianapolis Scientific & Engineering Foundation) whose objective is to have the engineers and scientists of the community cooperate and work together for the city, for themselves and for the upcoming generation of technical people. The class of '39 will be proud to learn that their classmate, Gordon Holbrook, II, presently a Director of ISEF and Chief Engineer of the Allison Division of GMC has, with the statesmanship expected of the upper echelon of GMC, caused a change of course of the Foundation which will make progress and accomplishment more worthwhile and more rapid. The class of 1928 also has a representative in the same organization, Tom Harvey, III. He was one of five Founder Members of the Foundation and served in 1965 as its president. He is currently serving as treasurer.—Thomas G. Harvey, '28, Secretary-Treasurer

#### **M.I.T. Club of Washington: Management and Water Pollution Examined**

Firm plans have been established for the M.I.T. Club of Washington Management Seminar to be held on February 18, 1967, at the Institute for Defense Analyses Building, Alexandria, Va. The subject of the seminar will be in the area of the changing role of management. Primary speakers and their topics will be Dean William F. Pounds, M.I.T. Sloan School of Management, "Quantitative Concepts and Management," Professor Warren G. Bennis, M.I.T. Sloan School, "Leadership in a Changing World," and Professor Zenon S. Zannetos, M.I.T. Sloan School, "Information Systems and the Management Process: New Directions?" Key management personnel in government and industry are serving on the planning committees for the seminar, ensuring a repeat of last year's successful venture in the area of laser sciences. The general public is invited.

The annual Christmas party was held on December 29, 1966, for high school students who have applied to M.I.T.

On January 25 a dinner meeting was held at the Cosmos Club featuring Mr. Earl Anderson, Deputy Commissioner of the Federal Water Pollution Agency, U.S. Department of the Interior.—Dan R. Mc-

Connell, '61, Technology Review Correspondent, 4134A Suitland Road, Suitland, Md. 20023

#### **M.I.T. Club of Western New York: Education Innovations Realized**

"Innovations In Education" will be presented April 10, 1967, in the Statler-Hilton Terrace Room in downtown Buffalo by Dr. James Ryan Killian, Chairman of the M.I.T. Corporation. Work started at M.I.T. while Dr. Killian was president of the Institute has resulted in a new high school physics course, a new mathematics course beginning in the grade schools, and a non-profit corporation which develops and sells teaching aids and demonstration material for high school science classes. Many of the demonstrations will be set up in the Statler-Hilton Terrace to illustrate Dr. Killian's address. Ladies are invited and the committee, headed by Charles Diebold, is inviting educators from all schools in the Niagara Frontier.—Donald R. Ferguson, Secretary, 333 Ellicott Street, Buffalo, N. Y.

#### **M.I.T. Club of Ontario: New Science Council Organized**

On Thursday, December 1, 1966, the M.I.T. Club of Ontario held its first meeting of the new season at the Granite Club in Toronto. Our guest speaker for the evening was Dr. Omond Solandt who is the first chairman of the new Science Council of Canada. He is also Chancellor of the University of Toronto. Dr. Solandt's comments were principally oriented to discussing the new Science Council, particularly with respect to its organization and objectives, but also its relationship to the industrial and educational communities. Dr. Solandt discussed a number of important scientific contributions made by Canadians and stated his belief that the Canadian scientific community has been of a high quality. The quantity of research done in Canada, however, will require a great deal of improvement, particularly in the industrial sector. Dr. Solandt's comments were very well received by an enthusiastic group of M.I.T. alumni and wives. Among those present were: Mr. and Mrs. A. Baker, Dr. and Mrs. M. Y. El Baroudi, Mr. and Mrs. J. Buss, Mr. D. Feenstra, Professor J. Ham, Mr. and Mrs. E. Kinsley, Mr. and Mrs. M. Koerner, Mr. and Mrs. A. Kotliar, Mr. and Mrs. E. Peacock, Mr. H. Pearson, Mr. and Mrs. R. Rice, Dr. and Mrs. R. Soberman, Professor O. Trass.—A. Kotliar, Secretary, 401 Don Mills Road, Toronto, Ontario

#### **M.I.T. Club of Kansas City:**

**Present and Prospective Students Dined**  
December 29 was the date of the annual luncheon at which the Kansas City M.I.T. Club entertains students currently attending Tech. This year we changed our approach somewhat; heretofore we have entertained both the students and their fathers, but this year had as our guests only the students plus the prospective students which the Educational Council has met in their interviews at the area high schools. We limited the attendance from the Club to the Club officers and the several representatives of the Educational Council.





Attendance at this fine luncheon was very gratifying. Some seven present students were there and contributed several insights and anecdotes on life at the Institute and the new facilities and programs. Eight prospective students were present and certainly were given a fine picture of the Institute atmosphere and standards, as well as the high caliber of the typical Tech student. Six members of the Educational Council and Club officers rounded out the group, which met for two hours. This approach to the annual luncheon, which the Kansas City M.I.T. Club has sponsored for at least 20 years, seemed to enhance still further the benefits and the pleasures of the luncheon.—B. J. Kirkwood, '49, Secretary

## **PLAN AHEAD RESERVE THESE DATES NOW FOR YOUR CLASS REUNION JUNE 9, 10, 11 AND ALUMNI DAY JUNE 12!**

- **RENEW OLD FRIENDSHIPS**
- **RELAX AND ENJOY A  
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- **COME BACK TO THE CAMPUS  
AND WITNESS THE MANY  
CHANGES; PARTICIPATE IN  
THE SEMINARS; MEET AND  
TALK WITH THE FACULTY**

*Full details are on  
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| SUNDAY                                                                                 | MONDAY                                                                            | TUESDAY                                                                           | WEDNESDAY                                                                               | THURSDAY                                            | FRIDAY | SATURDAY |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------|--------|----------|
| <b>FEBRUARY</b>                                                                        |                                                                                   |                                                                                   | 1                                                                                       | OPEN<br>EVERY<br>THURSDAY                           | 3      | 4        |
| 5                                                                                      |  | 7                                                                                 | 8                                                                                       | UNTIL<br><b>9</b>                                   | 10     | 11       |
| 12<br> | 13                                                                                |  | 15                                                                                      | PARK<br>FREE AT<br>CHURCH ST<br>GARAGE              | 17     | 18       |
| 19                                                                                     | 20                                                                                | 21                                                                                | 22<br> | FOR 1 HOUR<br>WITH PURCHASE<br>OF \$3.00<br>OR MORE | 24     | 25       |
| 26                                                                                     | 27                                                                                | 28                                                                                |        | <b>1967</b>                                         |        |          |

## "MADE-TO-MEASURE" SALE MONTH. AT THE COOP.

*"Be sure your tailor is a man of sense."*

*Oliver Wendell Holmes*

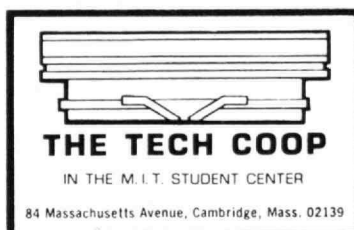
The Coop's Clothing Department has been making styling sense for its customers for years . . . especially now in February during the 10th Annual "Made-to-Measure" Clothing Sale. The Sale is one of the outstanding events in clothing industry. Come in, and choose from a wide selection of materials.

NO INCREASE IN SUIT PRICE OVER LAST YEAR'S SALE!

Suits \$99.50 Reg. \$135 to \$150  
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Men's Clothing Department, Second Floor, Main Store, where Joe Luongo and Pat Fiandaca, two of the finest tailors in the clothing industry, await to individualize your suit or sports coat.



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## Problem Solvers

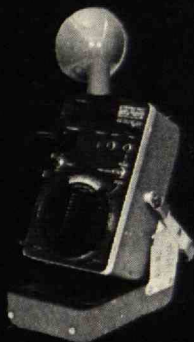
**Problem:** Find a dependable device to adjust ac voltage for control of current, power, light, heat, or speed.

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